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Forest Service

Pacific
Northwest
Region



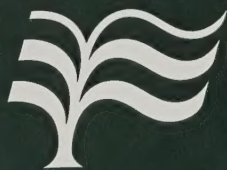
Western Spruce Budworm

1987 Operations Manual

John Barry
Jack Barry
M



United States
Department of
Agriculture



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1987 WESTERN SPRUCE BUDWORM SPRAY PROJECT

MALHEUR AND WENATCHEE NATIONAL FORESTS

PREFACE

This project plan is intended only to provide members of the 1987 Spruce Budworm Project team a historical and operational background to enhance project effectiveness. The project plan is not intended to be a part or replacement of any other document.

INSTRUCTIONS FOR MAINTENANCE OF THIS PLAN

Chiefs and others who have distribution authority for this plan are responsible for maintaining a distribution list so that additions and corrections will get to holders.

This plan is organized by chapter and page. Changes and additions will be compatible with the plan organization to facilitate insertions and deletions.

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1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER I

INTRODUCTION

CHAPTER I

INTRODUCTION

I. INFORMATION ON THE WESTERN SPRUCE BUDWORM

A. History

The western spruce budworm, Choristoneura occidentalis (Freeman), is native to North America coniferous forests. It occurs in most fir stands at low population levels. Predators, parasites, stand and weather conditions usually keep the budworm population at a low level. This natural population control complex is sometimes disrupted resulting in budworm outbreaks. Ponderosa pine/Douglas-fir co-climax, mixed conifer, white fir and subalpine fir communities are most often affected by spruce budworm (Hall 1973).

The first record of western spruce budworm in the Pacific Northwest region was in 1914. It was reared from Douglas-fir in Ashland, Oregon (Lindsten et al. 1949). Budworm defoliation was noted in limited areas of Oregon and Washington (Region 6) between 1928 and 1942. All of these infestations were small and subsided without causing appreciable timber loss (Lindsten et al. 1949, Carolin 1965). The first recorded spruce budworm outbreak in the Region 6 occurred in 1943 on the Okanogan National Forest. An estimated 200,000 acres were defoliated before the infestation collapsed naturally in 1948. In 1944, an outbreak on the Umatilla National Forest involved the entire fir host type throughout the Blue Mountains before collapsing. The increase in frequency, duration and extent of budworm outbreaks corresponds with the timing of effective fire suppression and selective harvest of high valued, seral tree species favoring the development of climax plant communities (Schmidt 1985). The climax plant communities consist of Douglas-fir, spruces, and true firs which are the preferred hosts of the budworm.

B. Biology

The western spruce budworm completes its life cycle in one year. The life cycle consists of four developmental stages-- egg, larva, pupa, and adult. The eggs are laid on the underside of needles in July and August. They hatch in about 10 days and the tiny larvae (caterpillars) overwinter in silken shelters under bark scales and among lichens without feeding. The budworms begin feeding in early May when they emerge from their shelters. After about 30 to 40 days of feeding, the larvae develop into pupae (the transformation stage from immature to adult). The mottled orange-brown moths emerge in approximately 10 days and begin the cycle again.

C. Biology

Tree damage occurs during the period of larval feeding. The larvae feed primarily on the new foliage and buds of Douglas-fir, grand fir and white fir. At high populations, the larvae extend their feeding to include old foliage, cones, seeds and other tree species. Examples

of alternative hosts are subalpine fir, engelmann spruce, western larch, lodgepole pine and ponderosa pine. Losses in tree growth and seed production, top kill, tree mortality and tree deformity are direct results of budworm feeding.

D. Past Suppression Practices

Direct suppression of budworm populations has been practiced since 1949. Spray projects from 1949 through 1962 used DDT. Following the ban on DDT, the Forest Service tested and used several other insecticides. These included malathion, acephate, mexacarbate and carbaryl. In operational use, only carbaryl has shown consistent results in reducing budworm population to targeted levels.

II. IMPACTS OF OUTBREAKS

Native insects evolve in the communities they affect and are therefore responsive to and limited by that community. Budworms play a variable role in the nutrient cycling and protein production within these ecosystems. The detrimental effects of budworm outbreaks are generally economic in nature and have to do with timber production. Recreation is also affected to a lesser extent.

A. Timber

Past timber harvest practices, fire exclusion and management philosophy have increased budworm habitat and risk of defoliation by increasing the Douglas-fir and true fir stand components (Hall 1981, West 1969). In Region 6 there is approximately 6.3 million acres of Douglas-fir, grand fir and white fir timber types. In addition, ponderosa pine timber types may also contain a fir understory susceptible to western spruce budworm. Risk of defoliation increases in these warmer, dryer Douglas-fir plant associations (Fellin 1983). Less defoliation and volume loss would occur if these stands were managed for the seral tree species, such as ponderosa pine and larch (Fellin 1983). Other sites -- white fir/twin flower/forb or white fir/huckleberry, are best adapted to growing true firs which will out-produce other tree species by 20 percent volume (Hall 1980 and 1981). These types of sites may have been the sites of historic minor outbreaks that subsided without much timber loss.

B. Other Forest Resources

Budworm outbreaks also have the potential to adversely affect recreation. Visual aesthetics are impaired by the number of dead, top-killed or grey trees. This effect is transitory, varying with the extent and duration of the outbreak.

Increases in defoliation, opens the canopy allowing light to reach the forest floor. Light penetration enhances forest litter decomposition and releases nutrients for plant growth. The increase in light also allows shade intolerant grasses and browse plants to grow thereby increasing the forage for big game and wildlife. This increase in forage may occasionally be obtained at the cost of hiding and thermal cover.

Increases in light have negligible effects on streams and watersheds. Though the annual runoff may increase depending on the level of defoliation, peak discharge rate will not be affected (Hicks 1977, Bethlahmy 1974, Potts 1984). Streambank cutting or sediment loading therefore, are unlikely to occur. The increase of light to streams does not alter the temperature of the stream significantly.

Budworm activities also enhance fish habitat through increased food supply and cover. Larvae falling into streams provide an additional food source to fish. Woody debris from budworm killed trees creates pools and hiding cover.

Trees top-killed or killed from years of repeated defoliation provide nest and perch sites for cavity-nesting birds and raptors. The numerous larvae feeding during outbreaks provides insectivorous birds and mammals with a large food source. As an indirect effect, the food supply of raptors and other predators is also increased.

III. TREATMENT ALTERNATIVES

A. Treatment History of the 1980 Outbreak

The current western spruce budworm outbreak began in the Blue Mountains of Oregon in 1980. Carbaryl and acephate were applied to portions of the outbreak in 1982. The carbaryl treated areas reached below the target level of 7 larvae/ 100 buds while the acephate treated areas did not. Sampling one year after treatment showed defoliation was light to moderate in the carbaryl treated areas but heavy in the acephate treated and control areas.

The 1983 project treated 525,000 acres with carbaryl and mexacarbate. The targeted level of 1.5 larvae/45-cm branch tip was reached on 80 percent of the units (Bridgwater 1983). The populations on the remaining units were greatly reduced (1.7 to 3.3 larvae/45-cm branch tip) but did not meet the targeted level. Problems with insecticide application were cited as possible reasons for this result.

Bacillus thuringiensis (B.t.), a biological insecticide, was tested on small areas of the Ochoco and Malheur National Forests in 1984 and 1985, respectively. The tests were conducted to determine the cost-effectiveness of various formulations and application techniques. All formulations tested in 1985 reduced the budworm population to 1 larva or pupa/45-cm branch tip. The helicopter application of Thuricide 32LV, 16BIU's/acre, applied at 64 fl.oz. per acre reduced larval density to 0.37 larva/45-cm branch tip (Ragenovich 1986).

B. Alternatives Eliminated From 1987 Project

The 1986 environmental assessment eliminated three categories of treatments from further consideration in that review process. These categories were:

1. Direct suppression with chemical insecticides
2. Suppression using silvicultural techniques
3. Biological methods other than B.t.

Chemical insecticides were eliminated from consideration due to the variability of effectiveness or the potential hazard to human health. The four chemicals currently registered with the Environmental Protection Agency (EPA) are malathion, acephate, mexacarbate, and carbaryl. The effectiveness of malathion, acephate, and mexacarbate for reducing budworm populations have not been demonstrated in past operational use. Carbaryl has been very effective in reducing budworm populations but has the potential for adverse effects on human health. The tests conducted in 1985 showed B.t. to be as effective as carbaryl without the same consequences on human health. The additional costs of planning, application, and mitigation did not justify the use of carbaryl as a treatment alternative.

Silvicultural management was viewed as a long-term management strategy and therefore not to have potential for reducing the current outbreak. When considering the manipulation of an insect's environment to regulate its population, the whole complex of climate, site, host, predators, parasites, and the insect itself must be considered. The budworm also does not contain itself to particular land ownerships requiring the coordination and cooperation between ownerships for effective control.

The use of biological control such as sterile male release, release of predators and parasites, and pheromone manipulation was dismissed from consideration due to inconclusive results in past use.

C. No Action Alternative

The no action alternative will allow the budworm outbreak to continue until it collapses due to natural factors or until subsequent environmental analysis finds the need for control measures. Budworm activity would continue to be monitored during aerial sketch map survey to determine the extent of visible defoliation. Timber harvesting and road building would continue in the infested areas though scheduling and timing of these activities may have to be adjusted.

D. Biological Insecticide (B.t.)

The application of Bacillus thuringiensis was the treatment chosen for the 1987 project. This will involve aerial application to reduce the budworm populations to non-damaging levels for a major part of the outbreak. Future retreatment of the same areas may be needed depending on post-treatment rates of population build-up from resurgence or reinvasion.

The application of B.t. will prevent further tree mortality or losses in volume due to top-kill and tree deformity. It is estimated that wood fiber production over the stand rotation will increase to 553 billion board feet (BF) per acre following treatment (Western Spruce Budworm Management in Oregon and Washington during 1987). This equates to about 8BF per acre per year.

B.t. is not expected to have negative impacts on other forest resources. It is toxic to only lepidopterous (moth and butterfly) larvae and does not affect other beneficial insects. The concentrations of B.t. used in this project will not be high enough to negatively impact wildlife, fisheries or livestock.

Human health hazard from the use of this insecticide has been studied and monitored in detail and is determined to be negligible when it's used as directed. Risk of human exposure is also expected to be low due to the remoteness of the treatment areas and public notification efforts. It is estimated that the density of persons exposed will be 1/75 acres.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER II

RESPONSIBILITIES AND COOPERATION

CHAPTER II

RESPONSIBILITIES AND COOPERATION

I. This chapter will briefly describe the roles and authority of the principal agencies involved in developing and implementing the Western Spruce Budworm Suppression Project.

A. USDA Forest Service

1. Forest Service policy is to protect and preserve the forest resources of the nation against destructive forest insects. The Agency's authority is directed to suppression and control of infestations.
2. The Forest Service concerned about the impact of the western spruce budworm, has implemented an analysis of damage within the Environmental Analysis. Since the western spruce budworm is native, control effort will be to suppress the population. The major portion of treatment area for 1987 is on National Forest land and, upon receiving funding, the Forest Service has initiated a suppression effort in 1987.

B. Oregon State Department of Forestry (OSDF)

1. OSDF's pest management authority is limited to suppression projects, while the authority for eradication projects rests with the Oregon Department of Agriculture (ODA).
2. The OSDF is concerned about the damage done by the pest and, therefore, has adopted the position of cooperating to the fullest extent possible with the USDA Forest Service in the 1987 spruce budworm project.

C. Bureau of Land Management

1. The authority to suppress and control infestations on federal forest lands is vested in the USDA Forest Service by federal law. The Bureau of Land Management, as a major federal land manager, is cooperating in the project to prevent detrimental impacts to forest land.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER III

ORGANIZATION

CHAPTER III

ORGANIZATION

This chapter presents the project organization and is to serve as a guide for information flow within the organization. In addition, the position descriptions for individual project positions are included.

MALHEUR NF SPRAY PROJECT

FOREST SUPERVISOR

Ken Evans

PROJECT DIRECTOR

Bill Butler

ENVIRON. MONITORING

SF&G LIAISON

Gene Silvosky

STATE & PRIV. LIAISON

Bryan Nelson

SAFETY CHIEF

Wayne Long

UNIT SAFETY OFF.

Everett White

UNIT SAFETY OFF.

Rich Thurman

PLANS/TECH ADVISORY

Jim Warner

PLANS COORDINATOR

Lynn Sullivan

PLANS ASST.

Dean Bishop

CARTOGRAPHER

Les Buystedt

RADIO TECH

Ray Roberts

COMPUTER TECH

Pete Lynly

METEOROLOGIST

ADMIN. OFF.

Myrna Evans

BUDGET/FINANCE

Ruth Cole

FLEET MANAGER

Alan Cosand

ADMIN. ASSIST.

Jean Cate

SERVICE SUPPORT

Jim Coyle

PUBLIC INFO OFF

Allen Gibbs

ASSISTANT PIO

Alexis Jackson

LAW ENFORCE

Don Jordan

UNIT DIRECTOR

Steve Howes

ASST. UNIT DIRECTOR

James Dague

UNIT ENTOMOLOGIST

Paul Buffam

ASST. UNIT ENTOMOLOGIST

Roy Mask

OPERATIONS MANAGER

Ron Libby

UNIT DIRECTOR

Don Hansen

ASST. UNIT DIRECTOR

M.J. Harvie

UNIT ENTOMOLOGIST

Dave Overhulser

ASST. UNIT ENTOMOLOGIST

Scott Tunnock

OPERATIONS MANAGER

Paul Joseph

Malheur NF Support Contacts

1. Chuck Graham (TM)
2. Mike Cavin (AO)

MALHEUR 1 - NORTH

UNIT DIRECTOR
Steve Howes

ASST. UNIT DIRECTOR
Jim Dague

UNIT ENTOMOLOGIST
Paul Buffam

ASST. UNIT ENTOMOLOGIST
Roy Mask

ASSESSMENT LEADER
Dick Wildman

OFFICE ASSISTANT
Penny Martin

OPERATIONS LEADER
Ron Libby

APPLICATION TEAM LEADER
Steve Culp

APPLICATION TEAM LEADER
Sandy Summers

APPLICATION TEAM LEADER
Dan Benson

AERIAL OBSERVER
Art Anderson

AERIAL OBSERVER
Steve Baumann

AERIAL OBSERVER
Joe Joy

AERIAL OBSERVER
Chuck Sallander

AERIAL OBSERVER
Dave Fieger

LOAD CHECKER
Marj Kalb

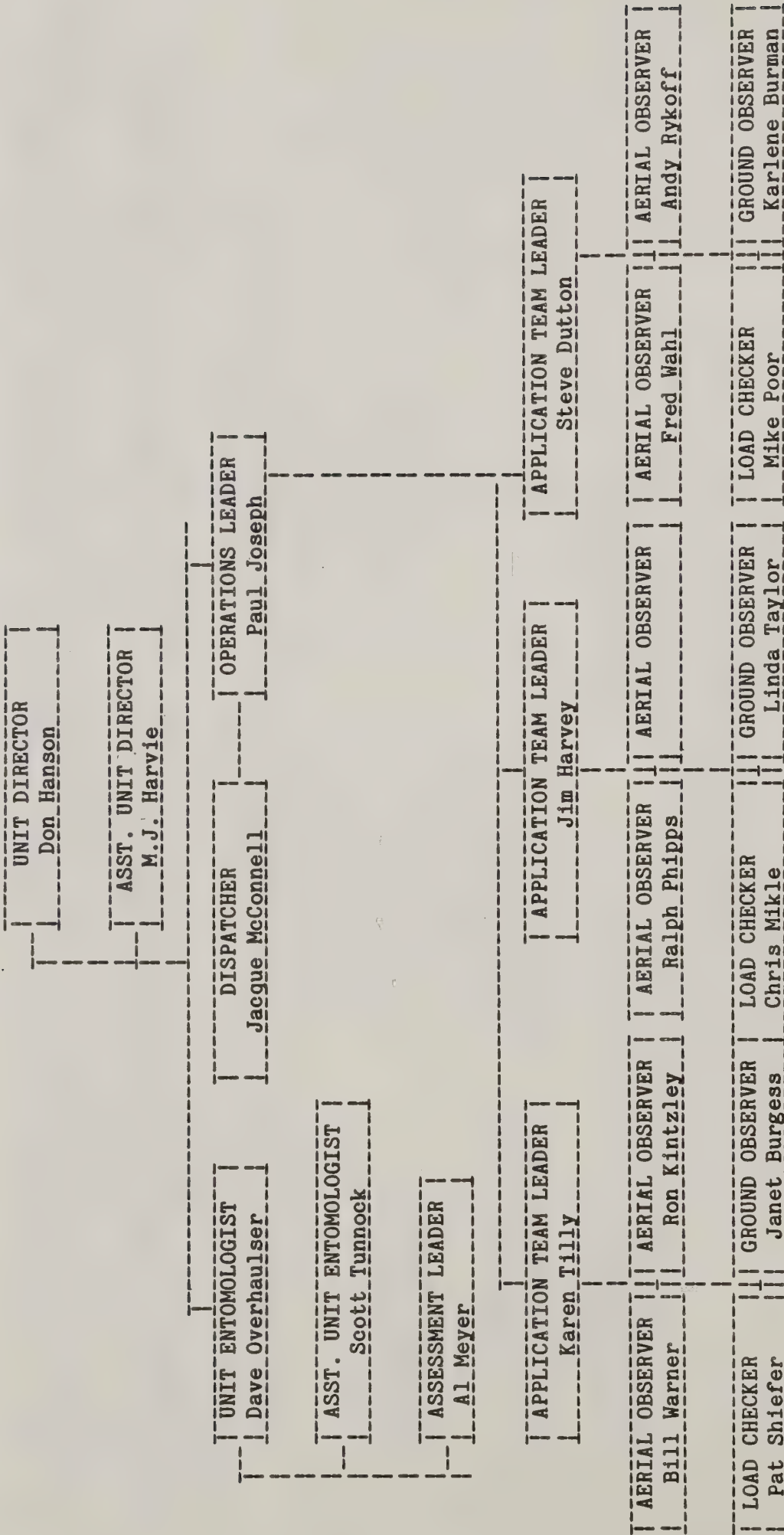
GROUND OBSERVER
Joe Lauderback

LOAD CHECKER
Linda McMahon

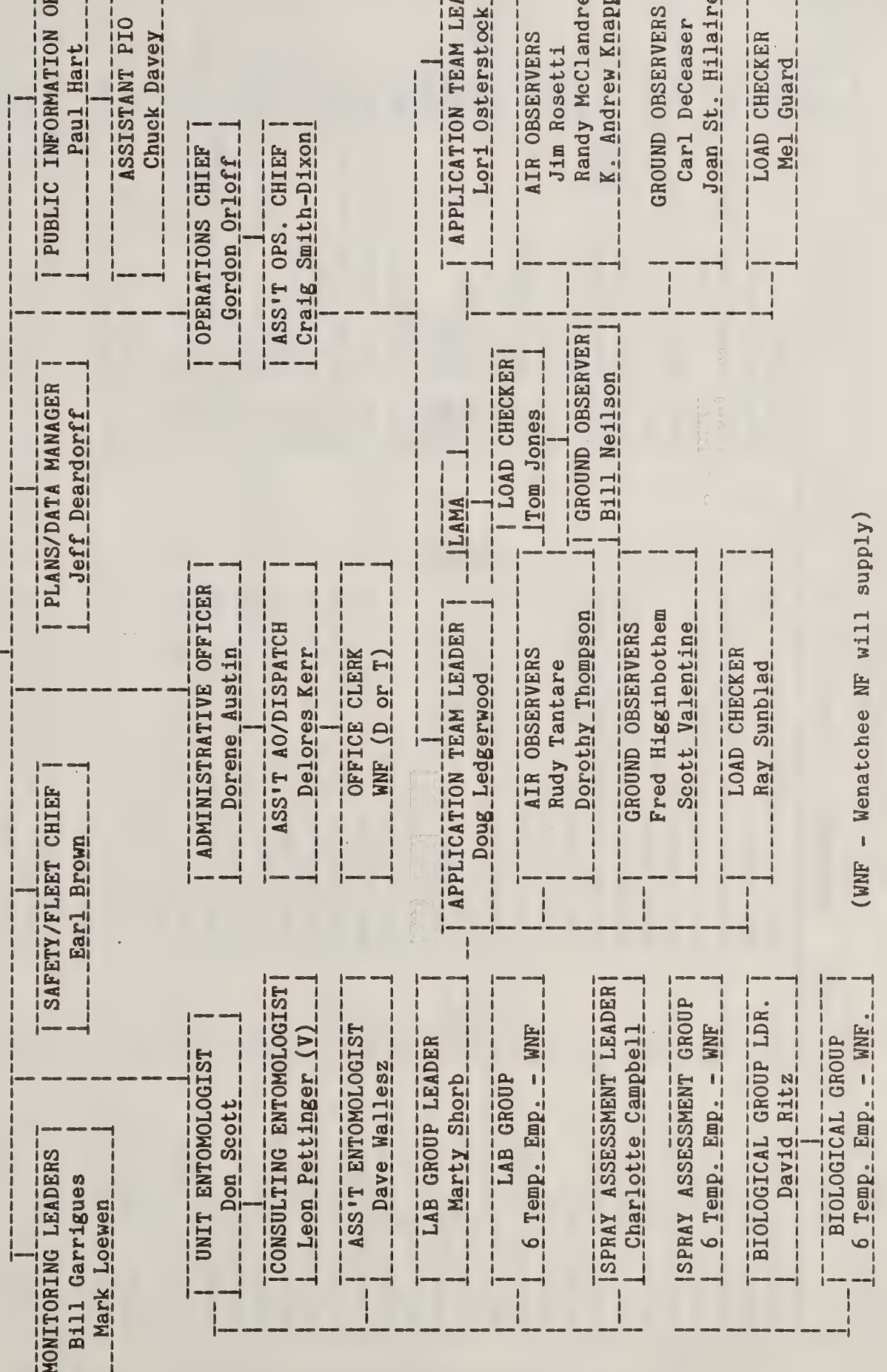
LOAD CHECKER
Rom Campbell

GROUND OBSERVER
Sandra Mitten

MALHEUR 2 - SOUTH



FOREST SUPERVISOR
 Gary Heath
 PROJECT DIRECTOR
 Ben Siminoe
 ASS'T PROJECT DIRECTOR
 John Keerseemaker
 DISTRICT RANGER
 Don Rotell
 LIAISON
 FOREST- Monty Bickford
 DISTRICT- Charlie Stansel
 --WENATCHEE NF SPRAY PROJECT--



(WNF - Wenatchee NF will supply)

May 21, 1987

MALHEUR SPRUCE BUDWORM ROSTER

	NAME	GRADE	ASSIGNMENT	COMM PHONE NO.	FTS	LOCATION	DG ADDRESS
1	Anderson, Art	GS-9	Aerial Observer	(503)937-2129		WIL, Lowell	WLOW
2	Benson, Dan		App Team Ldr		~	State of Oregon	NA
3	Bishop, Dean	GS-7/6	Assistant Plans	(503)896-3412	~	WIL, Cougar Zone (East)	WCZE
4	Boethin, Bill		Ground Observer	(503)575-1307	~	MAL, (Temp)	
5	Branham, William L.	GS-11	Bio Group Ldr		~	R-5, Shs-Trin, McCloud	R05F14D61A
6	Buffum, Paul	N/A	Unit Entomol		~	ODF	N/A
7	Burgess, Janet		Ground Observer	(503)573-7292	~	MAL, Burns (Thru C.Cagle)	MBUR
8	Burman, Karlene		Ground Observer	(503)573-7292	~	MAL, Burns (Thru C.Cagle)	MBUR
9	Butler, Bill		Proj Director	(206)436-1155	421-2727	MBS, Darrington	MDAR
10	Buystedt, Les		Plans - Records		~	WIL, Lowell	WLOW
11	Campbell, Ronald S.	GS-7/5	Load Checker		~	UMP, North Umpqua	R06F15D06A
12	Cate, Jean	GS-3/1	Payroll/Travel	(503)426-3104		WAW, Eagle Cap	R06F16D05A
13	Cole, Ruth	GS-7/9	BMA	(503)426-3104		WAW, Eagle Cap	R06F16D05A
14	Culp, Steve	GS-7/7	App Team Ldr	(503)523-6391	421-6779	WAW, Baker	WBAK
15	Dague, Jim		Asst Unit Dir		~	MTH, Barlow	MBAR
16	Dutton, Steve	NA	App Team Ldr			State of Oregon	NA
17	Evans, Myrna L.	GS-11	Admin Asst	(503)523-6391	421-6236	WAW, Nat'l Forest Hdqtrs	WAW
18	Feider, Sam	GS-5/4	Ground Observer	(509)843-1891		UMA, Pomeroy (M.J.Harvie)	UPOM
17	Halloway, Ross		Aerial Observer			State of Oregon	NA
18	Hanson, Don		Unit Direct(#2)		~	MAL, Bear Valley	R06F04D01A
19	Harvey, Jim	GS-6	App Team Ldr	(503)937-2129	~	WIL, Lowell	WLOW
20	Howes, Steve		Unit Direct(#1)	(503)221-6858	423-6858	R-6, R&WS	R06C
21	Joseph, Paul		Operations Mgr	(503)963-3168	~	State of Oregon, LaGrande	
22	Kalb, Marjorie	GS-5	Load Checker	(503)439-3011	~	SIS, Powers	SPOW

MALHEUR ROSTER (Continued)

	NAME	GRADE	ASSIGNMENT	COMM PHONE NO.	FTS	LOCATION	DG ADDRESS
23	Lauderback, Jae L.	GS-5	Ground Observer	(916)623-2121		R-5, Shs-Trin, Weavervle	R05F14D56A
24	Libby, Ron	GS-7	Operations Lead	(503)757-4558	420-4558	SIU, Mapleton	SMAP
25	MaMahon, Linda	GS-5	Load Checker	(916)367-2224	~	R-5, Tahoe Thru B.Beeks	R05F17A
26	Martin, Penny		Office Asst		~	DES,	~
27	McConnell, Jacque		Dispatch	(503)575-2110	~	MAL, Bear Valley	MBEV
28	Mitten, Sandra	GS-3	Ground Observer		~	UMP, Cottage Grove	UCOG
29	Mickle, Chris		Load Checker		~	DES,	~
30	Overhulser, Dave	N/A	Asst Unit Ento	(503)378-2218	NA	2600 State St Salem 97310	N/A
31	Phipps, Ralph	GS-9	Aerial Observer	(916)964-2184	~	R-5, Shsta-Trnity, McCld	R05F14D61A
32	Poor, Michael S.	GS-5	Load Checker	~	~	WIL, Rigdon	WRIG
33	Rykoff, Andy	GS-7/1	Arl Obs/Ld Chkr	(916)623-2121	(J.Rice)	R-5, Shs-Trin, Weavervle	R05F14D56A
34	Sallander, Charles	GS-9	Aerial Observer	(503)469-2196	~	SIS, Chetco	SCHE
35	Sullivan, Lynn		Plans Chief	(503)937-2129	NA	WIL, Lowell	WLOW
36	Summers, Sandra	GS-7	Application Tea	(503)937-2129	~	WIL, Lowell	WLOW
37	Tilley, Karen		Aerial Observer	~	~		
38	Tunnoch, Scott		Asst. Unit Ento	~	~		
39	Wahl, Fredrick E.	GS-7/5	Aerial Observer	~	~	DES, Crescent	DCRE
40	Warner, Jim		Plns/Tech Advsr	(503)487-5811	NA	SIU, Aalsea	SALS
41	Warner, William R.	GS-11	Aerial Observer	~	~	ROR, Applegate	RAPP

1987 SPRUCE BUDWORM ROSTER
WENATCHEE NATIONAL FOREST

<u>POSITION</u>	<u>PERSON</u>	<u>HOME UNIT</u>
Unit Director	Ben Siminoe	Heppner R.D., Umatilla N.F.
<u>Liaison</u>		
Forest District	Monte Bickford Charlie Stansel	Wenatchee S.O.-T.M. Naches R.D., Wenatchee N.F.
<u>Public Affairs</u>		
PIO	Paul Hart	Wenatchee S.O.
Asst. PIO	Chuck Davey	Naches R.D., Wenatchee N.F.
Asst. Unit Director	John Keerseemaker	Heppner R.D., Umatilla N.F.
<u>Monitoring</u>		
Leader	Bill Garrigues	Naches R.D., Wenatchee N.F.
Asst.	Mark Loewen	Naches R.D., Wenatchee N.F.
<u>Safety/Fleet</u>		
Safety Chief & Fleet Manager	Earl Brown	Naches R.D., Wenatchee N.F.
<u>Entomology</u>		
Unit Entomologist	Don Scott	R.O.-F.P.M. 503-221-
Asst. Entomologist		R-2, R.O.-F.P.M.
Volunteer Entomologist	Leon Pettinger	---
Lab Group Leader	Dave Wallesz	R.O.-F.P.M.
Lab Group Tech.		1.
		2.
		3.
		4.
		5.
		6.
Spray Assessment Leader	Pam Judd	Cle Elum R.D., Wenatchee N.F.
Spray Assessment Tech.		1. Wenatchee S.O.-T.M.
	Brian Sternbenz	2.
		3.
		4.
		5.
		6.
Bio. Group Leader	Dave Ritz	Bonnors Ferry R.D., IPNF
Bio. Tech.		1. Bonnors Ferry R.D., IPNF
		2.
		3.
		4.
		5.
		6.

WENATCHEE ROSTER (Continued)

<u>POSITION</u>	<u>PERSON</u>	<u>HOME UNIT</u>
<u>Operations</u>		
Operations Chief	Gordon Orloff	BLM, Eugene District
Asst. Oper. Chief	Craig Dixon	Bear Springs R.D., Mt. Hood N.F.
Team Leader	Doug Ledgerwood	Rigdon R.D., Willamette N.F.
Team Leader	Lori Osterstock	Lowell R.D., Willamette N.F.
Aerial Observer	Jim Rosetti	Bly R.D., Fremont N.F.
Aerial Observer	Rudy Tantarac	Brookings, Siskiyou N.F.
Aerial Observer	Joe Joy	Gold Beach R.D., Siskiyou N.F.
Aerial Observer	Larry Shaw	Entiat R.D., Wenatchee N.F.
Aerial Observer	Randy McClandress	Entiat R.D., Wenatchee N.F.
Ground Observer	Fred Higginbotham	Lakeview R.D., Fremont N.F.
Ground Observer	Carl Deceasar	R06F03D01
Ground Observer	Jim Archambeault	Twisp R.D., Okanogan N.F.
Ground Observer	Joan St. Hilaire	Naches R.D., Wenatchee N.F.
Load Checker	Roy Sundblad	R06F11D01A
Load Checker	Lynn Wyatt	Winthrop R.D., Okanogan N.F.
Load Checker	Tom Jones	Uma, Heppner
Ground Observer	Bill Neilson	Siu, Alsea
<u>Plans</u>		
Plans/Data Mgr.	Jeff Deardorff	Umpqua - S.O.
<u>Administration</u>		
Administrative Officer	Dorene Austin	Lk. Wenatchee R.D., Wenatchee NF
Asst. AO/Dispatcher	Delores Kerr	Hells Canyon NRA, Wallowa-Whitman N.F.
Dispatcher		
<u>Forest Support</u>		
Communication		S.O.-Comm.
Law Enforcement	Ben Hull/Roger Fusson	S.O.-L.E.
<u>District Support</u>		
Fleet	Dave Brewer	
Admin.		
Computer	Dave Rosinbum	
<u>Available</u>		
Lynn Wyatt, Winthrop 996-2266		
Jim Archambeault, Twisp		

PROJECT DIRECTOR

GENERAL RESPONSIBILITIES: The Project Director is directly responsible to the Forest Supervisor on which the project is being conducted for the planning, organizing, staffing, directing, and controlling necessary for the successful completion of the Western Spruce Budworm Suppression Project on the Malheur and Wenatchee National Forests. Since this is a multi-agency project, the Project Director must be prepared to take direction from a number of sources. USDA Forest Service will provide direction related to the overall strategy and operations on the project, contracts, public relations, compliance with various legal requirements, and other decisions related to the successful completion of the project. USDA Forest Service and other agencies, including OSDF and BLM, will provide advice related to project administration such as staffing, payroll, purchasing, property accountability, and safety.

Duties

1. Prior to the start of the project the Project Director will:
 - a. Prepare an Operations Plan for the project in conjunction with the project staff.
 - b. Develop the necessary organization for the successful completion of the project and recruit the needed personnel for the organization in conjunction with the project staff.
 - c. Assure himself that all personnel are adequately qualified and trained for the jobs they are to perform.
 - d. Maintain good relations between other agencies, landowners, and the general public through whatever means necessary.
 - e. Supervise pre-project activities on the project and assure himself that the preparation is adequate and timely for project success.
 - f. Keep the cooperating agencies and others informed of progress, problems, and developments.
 - g. Prepare reports as requested or needed.

2. During the project the Project Director will:
 - a. Coordinate and supervise all project activities and assure himself that plans and instructions are being implemented.
 - b. Conduct strategy and planning meetings as appropriate.
 - c. Check on and initiate action, if necessary, for the welfare and safety of all personnel.
 - d. Take required action on all cases of personnel deficiency.
 - e. Maintain good relations between other agencies, landowners, contractors and suppliers, and the public to the extent possible.
 - f. Keep the cooperating agencies and others informed of progress, problems, and developments.
 - g. Prepare reports as requested or needed.
 - h. Designate an Acting Project Director with full authority for decisions and actions when necessary.
 - i. Determine the time when demobilization should start and assure himself that the demobilization plan is properly implemented.
 - j. Conduct a critique of the entire project prior to dismissal of the project overhead.
 - k. Monitor project expenditures for budget accountability.

Knowledge, Skills and Abilities

1. Ability to manage a complex organization in a stressful situation including: planning, budgeting, organizing, evaluating, staffing, and directing resources to meet the project objectives.
2. Ability to effectively supervise.
3. Knowledge of project objectives and goals.
4. Knowledge of basic entomology, pesticide application procedures, legal requirements and other technical knowledge related to the project.
5. Ability to develop and maintain working relationships with other government agencies, landowners, contractors and the general public.
6. Ability to communicate effectively both orally and in writing.

ASSISTANT PROJECT DIRECTOR

GENERAL RESPONSIBILITIES: The Assistant Project Director is responsible to the Project Director on for the planning, organization, and execution of the "forestry" portion of the project. In addition, he will provide direct supervision of the various staff and support elements of the organization as shown on the organization chart. He must be familiar with all aspects of the project and assist the Project Director in securing an effective and well-coordinated project.

Duties

1. Prior to the start of the project the Assistant Project Director will:
 - a. Prepare an Operations Plan for the "forestry" portion of the project in conjunction with the project staff.
 - b. Develop the necessary organization for the successful completion of the project and recruit the needed personnel for the organization in conjunction with the project staff.
 - c. Assure himself that all personnel are adequately qualified and trained for the jobs they are to perform.
 - d. Maintain good relations between other agencies, landowners, and the general public through whatever means necessary.
 - e. Supervise pre-project activities on the "forestry" portion of the project and assure himself that the preparation is adequate and timely for project success.
 - f. Keep the Area Director, Insect and Disease Program Director, cooperating agencies and others informed of progress, problems, and developments.
 - g. Prepare reports as requested or needed.
2. During the project the Assistant Project Director will:
 - a. Coordinate and supervise all "forestry" project activities and assure himself that plans and instructions are being implemented.
 - b. Conduct strategy and planning meetings as appropriate.
 - c. Check on and initiate action, if necessary, for the welfare and safety of all personnel.
 - d. Take required action on all cases of personnel deficiency.
 - e. Maintain good relations between other agencies, landowners, contractors and suppliers, and the public to the extent possible.
 - f. Keep the cooperating agencies and others informed of progress, problems, and developments.

- g. Prepare reports as requested or needed.
- h. Designate an Acting Assistant Project Director with full authority for decisions and actions when necessary.
- i. Determine the time when demobilization should start and assure himself that the demobilization plan is properly implemented.
- j. Conduct a critique of the entire project prior to dismissal of the project overhead.

Knowledge, Skills and Abilities

- 1. Ability to manage a complex organization in a stressful situation including: planning, budgeting, organizing, evaluating, staffing, and directing resources to meet the project objectives.
- 2. Ability to effectively supervise.
- 3. Knowledge of project objectives and goals.
- 4. Knowledge of basic entomology, pesticide application procedures, legal requirements and other technical knowledge related to the project.
- 5. Ability to develop and maintain working relationships with other government agencies, landowners, contractors and the general public.
- 6. Ability to communicate effectively both orally and in writing.

PLANS AND TECHNICAL ADVISOR

GENERAL RESPONSIBILITIES: Responsible to the Project Director for the gathering of intelligence information necessary for the accomplishment of the project. Organizes staffs and supervises the Plans and Intelligence unit including: on-the-ground unit. Produces and coordinates the project operations plan and daily shift plans. Develops and implements the use of new technology used in the project. Participates in team planning sessions. Monitors project progress and effectiveness.

Duties

1. Plans, organizes, and supervises plans unit.
2. Select and train unit personnel.
3. Gathers, records, and communicates project information.
4. Coordinates overall and daily planning efforts.
5. Supervises and coordinates development of spray block plans.
6. Monitors entomology.
7. Monitors weather.
8. Provides necessary mapping.
9. Monitors and displays project progress and provides current data.
10. Develop and implement new technology.

Knowledge, Skills and Abilities

1. Ability to plan, organize, and control the gathering, assimilation, and communication of diverse project information.
2. Ability to plan for complex situations.
3. Knowledge of aerial application practices.
4. Knowledge of mapping and drafting techniques.
5. Knowledge of meteorological reporting systems.
6. Knowledge of record keeping, reporting, and data storage.
7. Knowledge of entomological considerations.
8. Knowledge of current aerial application technology.

PLANS COORDINATOR

GENERAL RESPONSIBILITIES: Responsible to the Plans Technical Advisor for assisting in the gathering of intelligence information necessary for the accomplishment of the project. Processes and coordinates spray block plans, daily shift Plans and project Operation plan. Supervise and coordinates the mapping, clerical, meteorologist and radio technician sections of the Plans Unit. Assists the Plans Technical Advisor as necessary and may substitute for the Plans Technical Advisor when needed. Participate in team planning sessions.

Duties:

1. Gathers, records, and communicates project information.
2. Reviews, drafts, and edits block spray plans, daily shift plans, and operation plans to produce final product.
3. Responsible for monitoring and displaying project status.
4. Supervises and coordinates the mapping and clerical sections of the P&T unit in the accomplishment of 1 and 2 above.
5. Organizes and maintains office systems.
6. Assists PTA as necessary.
7. Acts as PTA as needed.
8. Responsible for safety of assigned personnel.

Knowledge, Skills, and Abilities

1. Knowledge of aerial photography, mapping, and drafting.
2. Ability to do aerial photo locating and drafting.
3. Ability to supervise mapping and clerical personnel.
4. Ability to work long hours.
5. Ability to do field reconnaissance as necessary.
6. Ability to act as TA as necessary.
7. Knowledge of aerial pesticide applications.
8. Knowledge of meteorological reporting systems.
9. Ability to communicate with project personnel.

ASSISTANT PLANS COORDINATOR

GENERAL RESPONSIBILITIES: Responsible to the Plans Coordinator for the processing of block spray plans, daily shift plans and project operation plan. Supervise and coordinates the mapping and clerical sections of the P&I unit. Assists the Plans Coordinator as necessary and may substitute for the Plans Coordinator when needed.

Duties

1. Reviews, drafts, and edits block spray plans, daily shift plans, and operation plans to produce final product.
2. Responsible for monitoring and displaying project status.
3. Supervises and coordinates the clerical sections of the P&I unit in the accomplishment of 1 & 2 above.
4. Organizes and maintains office systems.
5. Assists Plans Coordinator as necessary.
6. Acts as Plans Coordinator as needed.
7. Responsible for safety of assigned personnel.

Knowledge, Skills, and Abilities

1. Knowledge of aerial photography, mapping, and drafting.
2. Ability to do aerial photo location and drafting.
3. Ability to supervise clerical personnel.
4. Ability to work long hours.
5. Knowledge of computer use.

LEAD CARTOGRAPHER

GENERAL RESPONSIBILITIES: The Cartographer is responsible to the Plans Coordinator mapping for the development of Base Maps and system. Drafts spary block plans, access plans and other mapping as needed. Assists in mapping project progress information. Develops and maintains map filing systems for project. Coordinates aerial photo and mapping needs. Supervise cartographers.

Duties:

1. Drafts plans on aerial photo base.
2. Transposes photo located information.
3. Computes acreages.
4. Advises plans organization on aerial photo and map needs and availability.
5. Coordinate unit personnel assisting in mapping.

Knowledge, Skills, and Abilities

1. Knowledge of drafting techniques.
2. Knowledge of photogrammetry.
3. Ability to photo locate and draft maps.
4. Ability to advise mapping unit on clearest and most efficient presentations.

CARTOGRAPHER

GENERAL RESPONSIBILITIES: The Cartographer is responsible to the Lead Cartographer. Drafts spray block plans, access plans and other mapping as needed. Assists in mapping project progress information. Develops and maintains map filing systems for project. Coordinates aerial photo and mapping needs.

Duties

1. Drafts plans on aerial photo base.
2. Transposes photo located information.
3. Computes acreages.
4. Advises plans organization on aerial photo and map needs and availability.
5. Coordinate unit personnel assisting in mapping.

Knowledge, Skills and Abilities

1. Knowledge of drafting techniques.
2. Knowledge of photogrammetry.
3. Ability to photo locate and draft maps.
4. Ability to advise mapping unit on clearest and most efficient presentations.

COMPUTER PROGRAMMER

GENERAL RESPONSIBILITIES: Responsible to the Plans Coordinator for development of computer programs for project use and data management. Assist project personnel in use of computer terminals for data entry and retrieval. Analyzes best use of computer technology and assists logistics in use.

Duties

1. Operates computers.
2. Assist project personnel in computer use.
3. Helps in data entry and retrieval.
4. Develops programs for data management.

Knowledge, Skills and Abilities

1. Knowledge of computer operation.
2. Knowledge of computer programming.
3. Ability to develop and manipulate data.
4. Ability to work with other personnel and teach them in computer use.

COMPUTER OPERATOR

GENERAL RESPONSIBILITIES: The Computer Operator is responsible to the Assistant Plans Coordinator; computer data entry and retrieval, mapping project progress, filing, typing and other projects as necessary. Receives and sends radio and telephone communications. Helps in the notification process procedures.

Duties

1. Operates computer to support plans section.
2. Helps compile and input word processing.
3. Structures and maintains a file system for the project.
4. Assists in mapping of project.
5. Operates radio and telecommunications systems.

Knowledge, Skills and Abilities

1. Knowledge of computer systems and printing and plotting equipment.
2. Knowledge of mapping and aerial photo interpretation.
3. Knowledge of radio procedures and operations planning.
4. Skills in various electronic data complying machines.
5. Ability to type 60 words per minute.
6. Ability to do drafting functions.
7. Ability to develop and maintain planning files.

METEOROLOGIST

GENERAL RESPONSIBILITIES: Responsible to the Plans Coordinator for morning and afternoon spot weather forecasts for the project area. Provides weather consultation during daily operations to predict local spray opportunities based on general meteorological data, local (project) weather reports, elevation, and aspect.

Duties

1. Assimilate meteorological data and applies it to produce localized forecasts for the project area and purpose.
2. Trains field weather scouts to take and report weather data.
3. Produce long- and short-range forecasts.
4. Provides weather consultation during daily operations to predict local spray opportunities.

Knowledge, Skills, and Abilities

1. Knowledge of meteorology (fire meteorological experience helpful).
2. Knowledge of mountainous terrain as related to local weather phenomena.
3. Knowledge of forest spray operations.
4. Knowledge of organizational planning and communication.
5. Ability to produce spot weather forecast tailored to project needs.
6. Ability to participate in team planning sessions.

PUBLIC INFORMATION OFFICER

GENERAL RESPONSIBILITIES: Supervises all public information and public affairs activities before, during, and after the Western Spruce Budworm Spray Project.

Duties

1. Responsible for coordinating information center at project headquarters.
2. Supervises Public Information staff.
3. Oversees public notification operations.
4. Coordinates internal information process.
5. Evaluates and documents the information operations of the project.
6. Serves as chief spokesperson to the news media visiting the project.
7. Releases news to news media and posts information in project facilities and other locations as appropriate.
8. Responsible for conducting media tours.
9. Responsible for orientation and dissemination of information to local USDA Forest Service and other agency units within zone of influence.

Knowledge, Skills, and Abilities

1. Ability to communicate both orally and in writing.
2. Ability to plan, organize, and control media information and its appropriate and timely release.
3. Ability to plan for and control complex situations.

ASSISTANT PUBLIC INFORMATION OFFICER

GENERAL RESPONSIBILITIES: The Assistant Public Information Officer serves as an assistant to the Public Information Officer and acts in his/her absence.

Duties

1. Responsible for answering media phones.
2. Responsible for the information center--monitoring supply of public and media materials and meeting media and public as they enter headquarters area.
3. Responsible for conducting media course as assigned by PIO.
4. Responsible for the preparation and dissemination of media release as directed by the PIO.

Knowledge, Skills, and Abilities

1. Ability to communicate both orally and in writing.
2. Ability to plan, organize, and control media information and its appropriate and timely release.
3. Ability to plan for and control complex situations.

ENVIRONMENTAL MONITORING AND LIAISON WITH OTHER AGENCIES

GENERAL RESPONSIBILITIES: Is responsible to the Project Director for the protection of sensitive resource values such as domestic or sensitive watersheds, threatened and endangered species, cultural resources and study plots. Conducts studies and monitoring activities to ensure sensitive resources values receive adequate protection. Also serves as Project Liaison Officer with other agencies, particularly with the BLM and Oregon State Department of Fish and Game.

Duties

1. Prepares and implements monitoring and study plans in cooperation with local resource personnel.
2. Provides for the protection of sensitive resource values.
3. Attends project briefings and expresses resource protection concerns.
4. Serves as resource advisor in the event of insecticide or toxic spill.
5. Hold status briefings for other agencies.
6. Reports any observations of operational problems to project leaders.
7. Serves as liaison between project management and other agencies and resolves their concerns.

Knowledge, Skills, and Abilities

1. Knowledge of project goals and objectives.
2. Knowledge of basic entomology, pesticide application procedures, legal requirements, and other technical aspects of the project.
3. Knowledge of monitoring and study techniques and their appropriate application.
4. Ability to develop and maintain good working relationships with other government agencies, landowners, contractors, and the general public.
5. Ability to communicate effectively both orally and in writing.

STATE AND PRIVATE LIAISON OFFICER

GENERAL RESPONSIBILITIES: The Liaison Officer is the on-the-ground coordinator between the Project Management Team and State and private individuals involved or affected by this project.

Duties

1. Attend project meetings and express State and private concerns.
2. Monitor spray block activities as to when it will be sprayed and keep landowners informed.
3. Notify landowners of time and date of spraying and obtain all necessary permission to enter upon their lands. Get permission to use private roads and obtain keys to gate locks.
4. See that project managers have correct legal descriptions of private and State lands to be treated.
5. See to it that operations people properly mark private and State land boundaries and use of spray cards.
6. Handle all complaints concerning landowners and the spraying of their property.

Knowledge, Skills, and Abilities

1. Knowledge of project goals and objectives.
2. Knowledge of basic entomology, pesticide application procedures, legal requirements, and other technical aspects of the project.
3. Ability to develop and maintain good working relationships with other government agencies, landowners, contractors, and the general public.
4. Ability to communicate effectively both orally and in writing.

LAW ENFORCEMENT OFFICER

GENERAL RESPONSIBILITIES: Is responsible to the Project Director to provide safeguards needed to protect personnel and property from loss or damage.

Duties

1. Establish contacts with local law enforcement agencies as required.
2. Provides for the security of project personnel and property.
3. Coordinates security activities with appropriate project personnel.
4. Keeps the peace, prevents assaults, settles disputes through coordination with local law enforcement agencies.
5. Prevents theft of all government and personal property.
6. Documents all complaints and suspicious occurrences.

Knowledge, Skills, and Abilities

1. Ability to communicate orally and in writing.
2. Knowledgeable of law enforcement techniques, laws, rules, and regulations.

SAFETY CHIEF

GENERAL RESPONSIBILITIES: The Project Safety Chief is responsible to the Project Director for providing advice and assistance to the spray project organization in any matters pertaining to the safety of project personnel and equipment. The Safety Chief will keep the Project Director and management team informed of accident potentials and occurrences. Although the Safety Chief may exercise emergency authority to stop or prevent unsafe acts when immediate action is required, the Safety Chief will generally correct unsafe acts or conditions through the regular line of project authority.

Duties

1. Develop a safety plan for the project.
2. Monitor the execution of the project safety plan.
3. Act as investigating officer on any accidents on the project involving personal injuries, vehicle, aircraft, or property damage.
4. Monitor spray project activities to identify, inventory, and analyze hazards and risks involved. Takes appropriate action to mitigate risks
5. Periodically inspects project operations for conformance with the safety plan and agency directives.
6. Work closely with all project personnel in administration of their job functions in a safe and efficient manner.
7. Prepares advisory reports to the Project Director for inclusion in shift plans during planning sessions. Recommends revisions or changes in practices relating to safety during the project.
8. Provide accident report forms and investigation report forms. Review with supervisors and if necessary, assist in completion of forms.
9. Instruct personnel as to project safety procedures.
10. Plan for medical emergencies, spill containment and control, decontamination and cleanup, and other operations as they arise during the field application and post application phase of the project. Prepare, and as necessary, execute a medical plan.
11. Instill a positive safety attitude during the project via safety messages, briefings, and reports.

Knowledge, Skills, and Abilities

1. Knowledge of all aspects of aerial spray operations.
2. Knowledge of rules and regulations regarding application of insecticides, particularly B.t.
3. Knowledge of emergency medical and evacuation procedures.
4. Knowledge of insecticide spill and emergency notification procedures.
5. Ability to communicate, both orally and in writing.

UNIT SAFETY OFFICER

GENERAL RESPONSIBILITIES: The unit Safety Officer is responsible to the Project Safety Chief and Unit Director for providing advice and assistance to ensure the health and safety of all personnel in the Unit organization. The Unit Safety Officer will assist the Project Safety Officer by monitoring accident potentials and occurrences, training unit personnel improper safety procedures, and developing a Unit safety plan. Although the Unit Safety Officer may exercise emergency authority to stop or prevent unsafe acts when immediate action is required, the Unit Safety Officer will generally correct unsafe acts or conditions through regular lines of project authority.

Duties:

1. Assist in developing the Project Safety and Medical Plan.
2. Assist in the execution and monitoring of the Project Safety Plan.
3. Make preliminary investigations of all Unit accidents involving personnel, equipment (vehicles and aircraft), or property damage.
4. Monitor all Unit activities to identify, inventory, and analyze hazards and risks involved.
5. Work closely with all Unit personnel to instill a positive safety attitude and high degree of safety awareness. This will include participating in safety meetings at all levels of Unit operations.
6. Assist the Project Safety Officer in carrying out emergency medical plans, spill containment, decontamination and cleanup, and other operations as the need arises.
7. Install warning and safety signs as needed during Unit operations.
8. Act as Project Safety Chief when properly designated.

Knowledge, Skills, and Abilities

1. Knowledge of all aspects of aerial spray operations.
2. Knowledge of rules and regulations regarding aerial application of insecticides.
3. Knowledge of the mode of operation of the primary control agent being used on the project.
4. Knowledge of emergency medical procedures.
5. Ability to communicate both orally and in writing.

ADMINISTRATIVE OFFICER

GENERAL RESPONSIBILITIES: The Administrative Officer is responsible to the Project Director for providing facilities and support services including communications, dispatching, supply, fiscal management, transportation, personnel welfare, and security in the proper amounts at the required time.

Duties

1. Establish a communications system that will provide adequate and continuous service for all functions of the project.
2. Organize a dispatching system to provide for timely distribution of resources in accordance with the daily work plan.
3. Provide housing and subsistence to all project personnel.
4. Provide for first aid facilities and transportation of the sick or injured to the doctor or hospital.
5. Provide an administration support unit to facilitate operations including routine office work, pay and travel costs, record maintenance, accounting and fiscal, and a complete record of project activities and accomplishments.
6. Provide for transportation of supplies, equipment, and personnel.
7. Provide security to the project headquarters insuring security of personnel and equipment.
8. Provide office and work space for all project personnel.
9. Provide contracts coordination.
10. Provide and/or make available off duty recreational opportunities.

Knowledge, Skills, and Abilities

1. Ability to manage a moderately complex and diverse organization in a stressful situation including planning, budgeting, organizing, evaluating, staffing, and directing resources to met project objectives.
2. Ability to supervise effectively.
3. Knowledge of project objectives and goals.
4. Ability to communicate effectively both orally and in writing.
5. Knowledge of fiscal regulations.

ADMINISTRATIVE ASSISTANT

GENERAL RESPONSIBILITIES: To provide administrative and clerical support to the Administrative Officer in cooperation with the Dispatcher.

Duties

1. Process all necessary personnel forms and paperwork; including, but not limited to: Personnel Actions and related forms, Personnel Data Information Sheet, Expense Claims and Travel Vouchers.
2. Accumulate work times for all project personnel and process payroll through appropriate agencies.
3. Accumulate vehicle mileage and cost data and distribute to appropriate agency offices.
4. Assist in preparation of cost estimates as necessary.

SUPPLY UNIT LEADER

GENERAL RESPONSIBILITIES: Maintain stock of supplies and obtain supplies needed to support headquarters and field operations as needed, when needed.

Duties

1. Pick up supplies from local dealers as requested.
2. Inventory all supplies when received.
3. Check out supplies to project personnel who will be responsible for their return if requested.
4. Receive supplies checked in by project personnel.
5. Maintain a current inventory of nonexpendable supplies on hand and of nonexpendable supplies checked out.
6. Assume the role of Service Branch Director in his absence.

FLEET MANAGER

GENERAL RESPONSIBILITIES: The project Fleet Manager is responsible to the Administrative Officer. The Fleet Manager will establish procedures for acquiring and maintaining vehicles.

Duties

1. Provide safe and reliable transportation for the duration of the project.
2. Provide for the repair of any vehicle failure in the field.
3. Provide for mechanical repair to all vehicles at project headquarters.
4. Make safety checks on project vehicles.
5. Provide prevention maintenance service to vehicles or make arrangements for such service.
6. Monitor the distribution and use of credit cards for fuel and vehicle supplies.

RADIO MANAGER

GENERAL RESPONSIBILITIES: To provide, coordinate and facilitate radio communciations for the entire project. This will require installing relays at strategic locations to provide total communications coverage to all points on the project.

Duties

1. Provide timely maintenance and repairs to all communications equipment.
2. Assign radios to project personnel as needed and maintain inventory accountability.
3. Insure that the computer terminal remains operational.
4. Provide training to all project personnel on proper usage, care and operation of the radios.

UNIT DIRECTOR

GENERAL RESPONSIBILITIES The Unit Director is responsible to the Project Director for the planning, organization, and execution of the field portion of the Western Spruce Budworm Control Project. In addition, he/she will provide direct supervision of the various staff and support elements of the project as shown on the organizational chart. He/she must be familiar with all aspects of the project including goals and objectives, legal requirements, air operations and safety, target insect population dynamics, and mode of operation of selected control agent. He/she is also responsible for assisting the Project Director in securing an effective and well coordinated project staff.

Duties

1. Prior to the start of the spray project, the Unit Director(s) will:
 - (a) Develop the necessary organization for the successful completion of the project and recruit the required personnel in conjunction with other project staff.
 - (b) Assist the Project Director in preparing a detailed Operations Plan for the project in cooperation with the project staff and other resource specialists.
 - (c) Assist in developing appropriate training programs and assure that all project personnel are properly trained and qualified for jobs they are to perform prior to initiation of the project.
 - (d) Assist in the supervision of pre-project activities of the project and assure that preparation is adequate and timely.
 - (e) Prepare reports as requested and/or needed.
 - (f) Maintain good relations between other agencies, landowners, and the general public through whatever means necessary.
 - (g) Serve as Acting Project Director when properly designated.
2. During the project, the Unit Director(s) will:
 - (a) Coordinate and supervise all field activities and assure that plans and instructions are being properly implemented.
 - (b) Conduct strategy and planning meetings regularly to ensure that project goals and objectives are clearly understood by all personnel and are accomplished in a timely, efficient, and safe manner.
 - (c) Monitor and, if necessary, initiate action to ensure the safety and welfare of all project personnel.
 - (d) Take required action on all cases of personnel deficiency.

Unit Director Cont.

- (e) Maintain good relations with other agencies, landowners, contractors and suppliers, and the general public to the extent possible.
- (f) Prepare reports as requested and/or needed.
- (g) Develop an efficient demobilization plan and properly implement it.
- (h) Conduct a review and critique of unit operations prior to dismissal of unit overhead.

Knowledge, Skills, and Abilities

1. Ability to manage a complex organization in a stressful situation including: planning and budgeting, organizing, evaluating, staffing, and directing resources to meet project goals and objectives.
2. Ability to effectively supervise.
3. Knowledge of project goals and objectives.
4. Knowledge of basic entomology, pesticide application procedures, legal requirements, and other technical aspects of the project.
5. Ability to develop and maintain working relationships with other government agencies, landowners, contractors, and the general public.
6. Ability to communicate effectively both orally and in writing.

ASSISTANT UNIT DIRECTOR

GENERAL RESPONSIBILITIES: The Assistant Unit Director is responsible to the Unit Director for assisting in the planning, organization, and execution of all aspects of the field portion of the Western Spruce Budworm Control Project. In addition, he/she will directly supervise the various staff and support elements of the project as shown on the organizational chart when designated as Acting by the Unit Director. He/she must be familiar with all aspects of the project including goals and objectives, legal requirements, air operations and safety, target insect population dynamics, and mode of operation of selected control agent. He/she is also responsible for assisting the Unit Director in securing an effective and well coordinated project staff and for accomplishing Unit objectives.

Duties

1. Prior to the start of the spray project, the Assistant Unit Director will:
 - (a) Assist in developing the necessary organization for the successful completion of the project and assist in recruiting the required personnel in conjunction with other project staff.
 - (b) Assist in preparation of a detailed Operations Plan in cooperation with the project staff and other resource specialists.
 - (c) Assist in developing and participate in appropriate training programs to ensure that all project personnel are properly trained and qualified for jobs they are to perform during the execution of the project.
 - (d) Assist in supervision of pre-project Unit activities and assure that preparation is adequate and timely.
 - (e) Prepare reports as requested and/or needed.
 - (f) Serve as Acting Unit Director when properly designated.
2. During the project, the Assistant Unit Director will:
 - (a) Assist in coordination and supervision of all field activities and assure that plans and instructions are being properly implemented.
 - (b) Participate in regularly scheduled strategy and planning meetings to ensure that project goals and objectives are clearly understood by all personnel and are accomplished in a timely, efficient, and safe manner.
 - (c) Monitor and, if necessary, initiate action to ensure the safety and welfare of all project personnel.
 - (d) Prepare reports as requested and/or needed.

- (e) Assist in developing and implementing an efficient Unit demobilization plan.
- (f) Assist in review and critique of Unit operations prior to dismissal of project overhead.
- (g) Serve as Acting Unit Director when properly designated.

Knowledge, Skills, and Abilities

1. Ability to manage a complex organization in a stressful situation including: planning and budgeting, organizing, evaluating, staffing, and directing resources to meet project goals and objectives.
2. Ability to effectively supervise.
3. Knowledge of project goals and objectives.
4. Knowledge of basic entomology, pesticide application procedures, legal requirements, and other technical aspects of the project.
5. Ability to develop and maintain working relationships with other government agencies, landowners, contractors, and the general public.
6. Ability to communicate effectively both orally and in writing.

OPERATIONS MANAGER

GENERAL RESPONSIBILITIES: Responsible to the Unit Director for the planning and implementation of all aerial and ground operations of the spray portion of the Western Spruce Budworm Control Project. Plans, coordinates, administers, and supervises all phases of insecticide application work. A major responsibility is to assist the Unit Director in securing and training an effective, well coordinated work force with which to accomplish the aerial spraying operation.

Duties

1. Plan, organize and supervise the field operations.
2. Assist the Project Leader in determining unit requirements for personnel, equipment, supplies and services.
3. Work closely and harmoniously with all state and federal agencies concerned with the project.
4. Conduct an efficient, effective and safe project at a reasonable cost with full consideration to protecting associated resources.
5. Assumes responsibility of all spray operations in assigned areas including:
 - (a) Providing instructions and training of unit personnel or individual work responsibilities.
 - (b) Developing good coordination and cooperation with contractors and other units on the project.
 - (c) Briefing spray pilots on block boundaries, flight patterns, critical areas and logistics support before spraying commences each day,
 - (d) Assume responsibility for decisions to suspend or resuming spraying each day.
 - (e) Enforce FAA and project safety regulations relative to aircraft.
 - (f) Maintain progress record and submit to project headquarters daily.
 - (g) Assume responsibility for implementation of unit search and rescue plan.

Knowledge, Skills and Abilities

1. Ability to plan, organize and control the operations section.
2. Sensitivity to social, political and environmental considerations in operational decisions.
3. Ability to integrate the people and procedures of different agencies.

4. Knowledge of aerial application operations.
 - (a) Treatment block design.
 - (b) Aircraft performance and capabilities.
 - (c) Calibration of spray equipment.
 - (d) Forest spray meteorology.
 - (e) Pesticide use management.
 - (f) Aerial observation of spray application.
 - (g) Aircraft safety.
5. Knowledge of Contract Administration,
 - (a) Knowledge of contractual requirements.
 - (b) Limits of delegated authority.
 - (c) Ability to work with contractor,
6. Management Skills
 - (a) Knowledge of basic managerial planning and control techniques.
 - (b) Supervision skills.
 - (c) Ability to plan and work safely.

APPLICATION TEAM LEADER

GENERAL RESPONSIBILITIES: Responsible for the day-to-day operation of one application team consisting of spray one observation ships, logistic support personnel, and contract inspection personnel. Responsible to the Operations Manager for operational activities and contractual matters. Responsible for safe and efficient heliport operations including aircraft, aircraft support logistics and pesticide logistics.

Duties

1. Plans and coordinates the daily activities of all parts of the application team, including aircraft, service equipment, airstrip and heliport personnel, aerial observer, load checker and ground observer.
2. Serves as Inspector for administration of the application and observation contracts.
3. Advise and assist Operations Manager in planning treatment sequence, airstrip selection traffic patterns and air safety requirements.
4. Collect, process and act on information provided by aerial observer, ground observer and spray assesment card team.
5. Responsible for safety of personnel and equipment operations on assigned unit.
6. Supervise the loading of spray aircraft with pesticide and maintain spray records by Aircraft and block number.
 - (a) Train and supervise load checkers, ground observers and aerial observers.
 - (b) Assure pesticide loads do not exceed weight limits.
 - (c) Observe loading area practices and corrects unsafe procedures
 - (d) Maintain surveillance of minimum fuel requirements for each helicopter during each days operating period.
7. Maintain records of takeoff and landing times of all air craft using the heliport/airstrip. Notifies Dispatch and Operation Manager when changes of blocks, heliport/airstrip or any out of the normal activity occures.
8. Report immediately any aircraft that is overdue to the Operations Manager and Dispatch.
9. Observe landings and takeoffs for conformance to prescribed flight patterns and safety procedures.

Knowledge, Skills and Abilities

1. Knowledge of aerial application operations.
 - (a) Treatment block design.
 - (b) Aircraft performance and capabilities.
 - (c) Calibration of spray equipment.
 - (d) Forest Spray meteorology.
 - (e) Pesticide use management.
 - (f) Aerial observation of spray application.
 - (g) Aircraft safety policies and practices.
2. Knowledge of Contract Administration.
 - (a) Knowledge of contractual requirements.
 - (b) Limits of delegated authority.
 - (c) Ability to work with contractor.
3. Management Skills.
 - (a) Knowledge of basic managerial planning and control techniques.
 - (b) Supervision skills.
 - (c) Ability to plan and work safely.

AERIAL OBSERVER

GENERAL RESPONSIBILITIES: Aerial Observers are responsible to the Application Team Leader for direction of the spray application and concurrent monitoring of contractor performance of both the spray and observer operations.

Duties

1. Become familiar with spray block boundaries, local landmarks, sensitive areas, communication blind spots and helispot locations.
2. Monitor aircraft for adherence to spray application requirements. Note and report any leaky nozzles or spray systems.
3. Make stop watch checks of spray application rate for each aircraft.
4. Recommend to Application Team Leader shutdown of spray aircraft when spray rises, drifts or starts to break up. In absence of Application Team Leader shuts down spraying on own initiative.
5. Check on all aircraft for safe flying practices and for observance of flight patterns to and from the block.
6. Assist Application Team Leader in posting daily spray coverage on the progress map.
7. Maintain accurate daily flight log.
8. Know location of all helispots/airstrips and emergency landing sites in or adjacent to all spray blocks.
9. Know the search and rescue plan and be prepared to act on it immediately, if necessary.
10. Act as inspector for Contracting Offices Representative as designated by C.O.R.
11. Responsible for (other than pilot) safety precautions, briefings, crash rescue plan, loading and unloading equipment and personnel from and around the observation helicopter.
12. Complete power checks first flight each day and post data.
13. Does daily safety checks with pilot on the observation aircraft.
14. Checks load calculations.
15. Check fuel truck and helicopter fuel sumps for contamination.
16. Briefs observation pilot on plans for next day's activities.

17. Participates in tailgate sessions on aircraft safety, daily or as needed.
18. Marks spray block boundaries.

Knowledge, Skills and Abilities

1. Knowledge of aerial spray operations.
2. Knowledge of aircraft safety practices.
3. Knowledge of forest spray meterology.
4. Knowledge of contract administration.
5. Skill in map and aerial photo interpretation.
6. Ability to exercise independent judgment in a timely manner under unusual situations.

LOAD CHECKER

GENERAL RESPONSIBILITIES: Load Checkers are responsible to the Application Team Leader for assisting in helispot operations.

Duties

1. Maintain spray load records for each aircraft by spray block.
2. Maintain records of takeoff and landing times for all aircraft using helispot/airstrip.
3. Monitor equipment for leaking nozzles, dump valves, hoses and tanks.
4. Drive pilot vehicle for batch trucks.
5. Monitor radio and record significant messages.
6. Maintain records of all pesticide hauling, loading and unloading.
7. Assist ATL in controlling access of people and vehicles to the helispot.

Knowledge, Skills and Abilities

1. Ability to maintain complete and accurate field records.
2. Knowledge of safe helispot practices.
3. Knowledge of basic radio procedures.
4. Basic contract knowledge.

GROUND OBSERVER

GENERAL RESPONSIBILITIES: Ground Observers are responsible to the Application Team Leader for the collection of necessary weather data on the spray blocks.

Duties

1. Arrive at the spray block before dawn. Radio general weather conditions to headquarters so crews can be dispatched or held in.
2. Take weather measurements (temperature, wind, RH., visibility) every 15 minutes or as directed during spray operations. Report weather information on request and record weather every 15 minutes or appropriate weather forms.
3. Assist Aerial Observer and Application Team Leader by:
 - a. Giving preliminary weather data prior to sunrise.
 - b. Giving current weather conditions during application.
 - c. Report spray behavior by:
 - (1) Movement patterns.
 - (2) Immediate density and droplet size (when possible).
4. Assist spray assessment crews in putting out card lines close to the Ground Observers location.

Knowledge, Skills and Abilities

1. Knowledge of basic weather measurements and meteorology.
2. Skill at navigating with a map and aerial photo.
3. Safe driving record.
4. Knowledge of basic radio procedures.
5. Knowledge of spray equipment and spray behavior.
6. Ability to field read spray deposit cards.

DISPATCHER

GENERAL RESPONSIBILITIES: The Dispatcher is directly responsible to the Operation Manager for dispatching and tracking the placement of personnel, equipment and supplies used on the project. The Dispatcher is responsible for coordinating all radio communication on their unit and documenting vital information.

Duties

1. Provide for the recording and delivery of all radio messages.
2. Continuously track and record the placement of personnel, equipment and supplies to insure a safe and economic project.
3. Operate and monitor project radio traffic and assure smooth operation consistent with good communication practices.
4. Keep the Operations Manager, Unit Director and Project Director informed of important activities and events.
5. Provides emergency information as needed.

Knowledge, Skills, and Abilities

1. Knowledge of project organization and daily operational practices.
2. Knowledge of the capability and operation of the project's radio system.
3. Knowledge of proper radio procedures.
4. Ability to plan, organize and direct a complex communications and dispatch operation.
5. Ability to communicate effectively, both orally and in writing.
6. Ability to gather and keep legible and accurate information in a timely and organized manner.
7. Knowledge of the project's spill plan and the ability to implement this plan when directed to do so.
8. Ability to screen activities so that communications flow effectively, and to the appropriate personnel.
9. Knowledge and needed information to implement the Project Rescue Plan.

OFFICE ASSISTANT

GENERAL RESPONSIBILITIES: The Office Assistant person is directly responsible to the Operation Manager. The Office Assistant person is responsible for maintaining all file records for the Air Operation group and assists Dispatch and Administration when available.

Duties

1. Gather, file, and distribute all documents generated by the Air Operation crews.
2. Key punch necessary document information into computers for further distribution.
3. Maintain an adequate supply of forms for Air Operation crews.
4. Answer phones.
5. Assist Administration, Dispatch, and Budget & Finance when time permits.
6. Type.

Knowledge, Skills and Abilities

1. Ability to keep accurate file records.
2. Basic knowledge of operating computers and typing.
3. Knowledge of basic radio procedures.
4. Basic knowledge of the Contracts and Contract administration.
5. Knowledge of the search and rescue plan.
6. Ability to work with others.

PROJECT/UNIT ENTOMOLOGIST

GENERAL RESPONSIBILITIES: The Project or Unit Entomologist serves as a staff assistant to the Project Director or Unit Supervisor and is responsible for all biological aspects of the project on an assigned control unit.

Duties

1. Organize biological phases of the project on an assigned control unit.
2. Trains assistants and coordinates training of crew leaders and crews, with emphasis on quality of work and safety, especially in off-highway and primitive road driving.
3. Delineates spray block boundaries in conjunction with Project or Unit Operations Manager.
4. Establish biological development and evaluation plots.
5. Evaluate pest development data and recommend dates for release of spray blocks.
6. Provide advice to Project Director or Unit Supervisor in carrying out responsibilities for direction of the spray program.
7. Evaluate effectiveness of treatments from evaluation plot data.
8. Maintain biological records, including updating of computer data files, coordinate the preparation of daily progress maps and tabulation and summarization of block development/treatment data.
9. Assist in writing final project accomplishment.

ASSISTANT PROJECT/UNIT ENTOMOLOGIST

GENERAL RESPONSIBILITIES: The Assistant Project or Unit Entomologist is responsible to the Project Entomologist for supervising the technical staff and overseeing and coordinating technical aspects of the project's biological work activities.

Duties

1. Train and supervise Spray Assessment Group Leader, Lab Group Leader, and Biological Group Leader, with emphasis on safety and work quality.
2. Make periodic observations to determine insect development and advise the Project or Unit Entomologist.
3. Assist the Project or Unit Entomologist and Operations Manager in designing spray blocks.
4. Coordinate the selection and layout of insect development and evaluation plots and supervise the preparation of work schedules for Biological, Lab, and Spray Assessment crews.
5. Assist the Project or Unit Entomologist in planning and scheduling of plots for insect density or development sampling, spray assessment sampling, and sample processing.
6. Provide assistance to the Spray Assessment Group Leader, Lab Group Leader, and Biological Group Leader when needed.
7. Determine and request necessary supplies, equipment, and maps for Lab, Biological and Spray Assessment crews.

UNIT ENTOMOLOGIST

GENERAL RESPONSIBILITIES: Responsible to the Unit Director Chief for monitoring insect development and distribution. Provides consultation on spray timing and location priorities. Monitors and evaluates project effectiveness.

Duties

1. Monitors and predicts insect development.
2. Participates in team planning sessions.
3. Reports on project effectiveness.
4. Supervises entomology unit.
5. Responsible for safety of assigned personnel.

Knowledge, Skills, and Abilities

1. Knowledge of entomology (with expertise on the western spruce budworm).
2. Ability to communicate and incorporate entomological information into project operations.
3. Knowledge of aerial pesticide applications.
4. Ability to design and evaluate field sampling efforts.

BIOLOGICAL GROUP LEADER

GENERAL RESPONSIBILITIES: The Biological Group Leader is directly responsible to the Assistant Project or Unit Entomologist for supervising the Biological Aides in field activities concerned with collecting and handling insect and foliage samples used in the biological activities of the project.

Duties

1. Train Biological Aides in appropriate field sampling procedures, with emphasis on safety and work quality.
2. Prepare rosters and coordinate work schedules of Biological Aides assigned to field duty.
3. Supervise Biological Aides in conducting field activities.
4. Cooperate with the Laboratory Group Leader in coordinating assignments and activities of the Biological Aides.
5. Secure safe and proper delivery of field collections to the laboratory for storage or processing.
6. Maintain complete and accurate records of all field activities.
7. Maintain on-going communications with Project or Unit Entomologist and their Assistants.

Knowledge, Skills and Abilities

1. Ability to communicate effectively with a wide variety of people.
2. Ability to train and supervise personnel in field procedures needed to accomplish project biological work.
3. Knowledge of standard sampling procedures used in the project.
4. Skills in map interpretation, orientation and sample plot establishment.
5. Organizational skills in handling large numbers of samples and corresponding data.

LABORATORY GROUP LEADER

GENERAL RESPONSIBILITIES: The Laboratory Group Leader is directly responsible to the Assistant Project or Unit Entomologist for supervising the Biological Aides in laboratory procedures used in conducting the processing of samples. The Laboratory Group Leader is also primarily responsible for computer entry of biological data and maintenance of the entomological database.

Duties

1. Train Biological Aides in appropriate laboratory procedures.
2. Prepare rosters and coordinate work schedules of Biological Aides assigned to laboratory duty.
3. Supervise Biological Aides in performing laboratory duties.
4. Cooperate with Biological Group Leader in coordinating assignments and activities of the Biological Aides.
5. Maintain complete and accurate records of daily laboratory activities.
6. Maintain on-going charts and graphs of insect and phenological development.
7. Provide data input for processing through the Fort Collins Computer Center (FCCC).
8. Maintain on-going communications with Project or Unit Entomologist or their Assistants, providing them with continually up-dated information on insect and foliage development and status of processing of foliage samples held in cold storage.

Knowledge, Skills and Abilities

1. Ability to train and supervise personnel in basic biological laboratory procedures.
2. Ability to communicate with supervisory and subordinate personnel.
3. Ability to coordinate large quantities of laboratory data and communicate it through graphic methods.
4. Ability to input data with the Forms Entry System (FES) on the Data General computer and process it through FCCC.

SPRAY ASSESSMENT GROUP LEADER

GENERAL RESPONSIBILITIES: The Spray Assessment Group Leader is responsible to the Project Entomologist for supervising the spray card/weather crews. Principle duties include:

Duties

1. Assists Project or Unit Entomologist in developing the Spray Deposit Guidelines, including sampling scheme and spray assessment forms.
2. Trains spray card/weather personnel.
3. Supervises spray card/weather personnel.
4. Coordinates spray card/weather personnel operations with application team operations. Sits in on Operation team meetings to determine next day's block treatment schedule and order of treatment.
5. Reports any problems in spray application relative to spray cards to appropriate Air Operations Manager.
6. Summarizes daily spray deposit assessment information as soon as possible and makes that information available to Operations.
7. Analyzes spray deposit on cards to validate crew's card readings.

SPRAY CARD CHECKER/WEATHER OBSERVER (S.C.C./W.O.)

GENERAL RESPONSIBILITIES: S.C.C./W.O. are responsible to the Spray Assessment Group Leader for the placement and analysis of spray cards and weather information. They will assist the Application Team leader by providing feedback on the quality of the spray application. They will monitor the application contractor to assure adequate treatment.

Duties

1. Assist Aerial Observer and Application Team Leader by:
 - a. Giving preliminary weather data prior to sunrise.
 - b. Give current weather conditions during application.
 - c. Report spray behavior by:
 - (1) Spray cloud behavior and movement patterns;
 - (2) Immediate density estimate and droplet size characteristics (when possible).
2. Be responsible for all aspects of card lines including:
 - a. Location in spray block:
 - (1) Select card line location.
 - (a) Obtain landowner's permission
 - (b) Insure site is well inside correct spray block boundary.
 - (2) Plots card line location on District Transportation map for treatment verification.
 - (3) Maintains secrecy of card line location until after treatment.
 - (4) Plot card line location on Operations Map after treatment.
 - b. Card Line installation:
 - (1) Selects card line site ahead of time.
 - (2) Puts wire holders out the day before.
 - (3) Insures cards are in good locations:
 - (a) Cards are not under trees.
 - (b) In locations the cards are not readily visible from the air.
 - (c) Where grazing animals cannot disturb them.

- c. Card identification and processing
 - (1) Label all spray cards.
 - (2) Put cards into card frames.
 - (3) Collect cards after treatment, putting cards into slotted boxes.
- 3. Spray card processing
 - a. Measure spray desposit
 - (1) Spray droplets per square centimeter.
 - (2) Reports on abnormal droplet sizes.
 - b. Record deposit information on appropriate forms.
 - c. Insure prompt return and notification to the Operations Section of cards that are less than adequate.

Knowledge, Skills and Abilities

- 1. Ability to drive safely in rough terrain.
- 2. Ability to work with a wide variety of individuals.
- 3. Ability to write clearly.
- 4. Ability to communicate verbally.
- 5. Knowledge of spray activities.
- 6. Familiar with spray blocks.
- 7. Knowledge of basic radio procedures.

BIOLOGICAL AIDES (FIELD AND LAB)

GENERAL RESPONSIBILITIES: Biological Aides work under the supervision of the Biological and Laboratory Group Leaders. In the field, Biological Aides make periodic collections of budworm larvae and host foliage within designated treatment units. In the Laboratory, they perform the necessary observations and measurements of these field samples to provide the data upon which spray treatment is scheduled and evaluated.

Duties

1. Through specialized training become familiar with overall Entomological Plan for the Project.
2. Following special training, comply with safety codes and employ safe work practices at all times.
3. Assist crew leaders in locating and establishing sampling plots and become thoroughly familiar with locations of treatment blocks and safest routes to them.
4. Collect periodic insect and foliage samples for laboratory analysis.
5. Measure larval and foliage samples in the laboratory to determine insect and foliage development, defoliation, and larval mortality.
6. Observe performance of spray aircraft whenever possible to help application team in determining spray behavior.
7. Perform other duties as assigned by the Biological or Laboratory Group Leader.

Knowledge, Skills, and Abilities

1. Physical ability to perform safely in the forest using tools required for sampling.
2. Excellent driving skills.
3. Basic knowledge of standard laboratory procedures and equipment used in biological analysis.
4. Ability to write clearly and legibly.
- t. Ability to make careful observations and verbally communicate findings clearly.
- 6 Ability to perform duties with a minimum of supervision.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER IV

OPERATIONS

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OPERATIONS

I. PRE-SPRAY

A. The air operations group will work with the Entomologists to make spray block boundary designations. The operation group will approve heliport or airstripe location selections based on the on-the-ground visual inspections. Spray block boundaries will be designated using the following criteria:

- a. Draws and streams
- b. Ridges
- c. Roads
- d. Property lines
- e. Aspect of slope
- f. Altitude
- g. Other distinguishing landforms
- h. Sensitive areas

The heliports or airstrips will be approved so that they are:

- a. Close to, or within the block to be sprayed
- b. Large enough to handle all necessary spray equipment and personnel
- c. Within safety limits
- d. Accessible to ground transportation
- e. Environmentally acceptable

Block boundaries and heliport/airstrip locations will be delivered to the Plans and Intelligence Unit for map preparation.

The operations unit will provide all training necessary for accomplishing all spray objectives. Training sessions scheduled include:

- a. Aircraft safety
- b. Defensive driving
- c. Contract administration
- d. Project orientation

e. First aid

Operations will be responsible for all spray ship and observer ship inspections and pilot certifications. They will insure that meters are certified accurate and spray equipment meets contract specifications. A file on equipment will be maintained throughout the project for all equipment used.

Operations will be responsible for calibration and characterization of each spray aircraft used. Calibration of a spray system is the adjusting of one or more of several factors so the proper amount of pesticide is applied per unit of area. (See below.) In order to calibrate, you must first know desired date of application and the following:

- a. Rate of application
- b. Application speed
- c. Swath width
- d. Flow rate
- e. Rotary nozzle operation

1. Rate of Application

The desired rate of application is specified per acre as a contract requirement. (.75 gal. solution)

2. Application Speed

The allowable airspeed is determined by the model of spray aircraft being calibrated. After calibration, airspeed for that aircraft remains fixed for field application.

3. Swath Width

Swath width will be determined by the effective amount of pesticide distributed evenly on spray deposit cards with a minimum of 20 drops/sq. cm.

4. Spray Pressure

The spray pressure and flow rate for calibration is dependent on type of nozzle used, as well as speed. The allowable range in operating spray pressure at the boom will be +5 p.s.i. The calibrated boom pressure will remain constant for application.

Calibration Calculation

An aircraft spray system can be calibrated on the ground or in the air using the following formula:

$$\text{Acres per minute} = \frac{2 \times \text{Swath Width} \times \text{Miles per hour}}{1000}$$

When: Swath width equals the simulated adequate application width for the given aircraft and its spray configuration.

Example: Determine the acres per minute for an aircraft flying 50 MPH with a 100-ft. effective swath.

$$\frac{2 \times 100 \times 50}{1000} = 10 \text{ acres per minute}$$

If a gallon of spray is to be applied per acre, the flow rate should be calibrated to disperse liquid at the rate of 1 x 10 or 10 gallons per minute (flow rate).

Knowing the gallons per minute required, the number of nozzles can be calculated using the manufacturer's data for that type and pressure. If 8010 flat atomizing teejet nozzles are used at 40 p.s.i., the discharge rate is 1.0 gallon of liquid at 70 degrees F per minute per nozzle.

No. of Nozzles required = $\frac{\text{Flow rate G.P.M.}}{\text{Nozzle Discharge 1 min. at p.s.i.}}$

$$= \frac{10}{1.0} = 10 \text{ nozzles}$$

Discharge Calibration

Having installed the desired type, size and number of nozzles, the output of the system should be checked to see that the correct discharge in gallons per minute is taking place. If the pump can be run at operating speed with the aircraft stationary, nozzle discharge can be checked with a measuring container and a stop watch.

Boom pressure must remain constant. If the stationary test cannot be done, then the spray tanks should be filled with water or fuel oil to a known mark. The aircraft then flies for a given length of time and is brought back to the same position as used previously and the amount of water or fuel oil is determined by reading the tank scale, or refilling to the first mark with a measuring device.

Adjusting Calibration

1. If the flow rate is more than calculated:
 - a. Check nozzles for oversize orifices, replace if necessary, and repeat calibration procedure; or
 - b. Adjust for proper boom pressure if this was too high and repeat calibration procedure; or
2. If the discharge volume is less than calculated:
 - a. Clean nozzles and repeat calibration procedure; or
 - b. Adjust for proper boom pressure if this was too low and repeat calibration procedure; or

- c. Add sufficient nozzles to bring application time within the allowable range and repeat application procedure.
 - d. Increase orifice size
3. Proper calibration should normally be obtained in three or less attempts. If more than three trials are required and results are erratic, the following possibilities should be investigated:
- a. Aircraft pump defective;
 - b. Dirt or other foreign material present in spray system, or in calibration solution;
 - c. Stop watch defective; and/or
 - d. Reading measuring devices wrong or error in computations.

The pressure and airspeed are now fixed for tests and the application.

Checking Calibration in Air

When an aircraft has been calibrated, the airspeed, spraying pressure, height of flight, and the effective swath width are fixed. Applications must be made at the same settings.

The spray system calibration should be checked in the air as soon as possible after obtaining acceptable ground calibration, and daily thereafter. This can be accomplished by using a stop watch to determine the time it takes to spray out a known quantity of spray:

Example: Desired Flow Rate - 10 GPM

Gallons in Load - 80 Gallons

Desired Application Time - 80 - 8 minutes
10

Actual Time to Spray - 8 minutes 10 seconds.
(Allow + or -5 % from desired time.)

Aerial Observers will check the calibration of each assigned spray aircraft daily. Records of the time required to spray out a known load quantity will be maintained on Form 25.

Swath Pattern Tests

With the application rate now established, the swath pattern should be checked to see that the distribution across the swath is as uniform as possible.

The best method of spray pattern testing consists of adding a tracer (dye, fluorescent material, etc.) to water or fuel oil in the tank(s) of the aircraft. The aircraft is then flown at the appropriate airspeed and height and the spraying system is operated

at the appropriate pressure. One pass is made over a row of target plates or cards laid out at right angles to the direction of flight. The aircraft flies over the center of the target line 300 to 500 feet wide. One pass should be made upwind and one crosswind. Wind speed should be as low as possible. The targets are collected and the spray deposit on each target is measured by the quantity of tracer. From the results, the distribution curve of the pattern can be determined. Corrections to the nozzle location can be made and the results checked by further testing.

A less satisfactory method is to lay out a roll of paper tape (adding machine tape) and visually inspect the resultant pattern. Interpretation of the spray pattern using this method is at best, only a rough estimate of the uniformity of the deposit pattern.

Checking Flight Speed

The application speed of spray aircraft should be checked frequently, using the following procedures.

1. Paced with observation helicopter
2. Time the interval that a spraying Aircraft takes to cover a distance between two known points with a stop watch to the nearest second.
3. Measure the distance of the flight line between the two known points on an accurate map or a photo to the nearest foot.
4. Calculate the application speed using the following formula.

$$\text{MPH} = \frac{\text{DISTANCE IN FEET}}{\text{TIME IN SECONDS} \times 1.47}$$

Examples: A spraying Aircraft covered a measured flight distance of 3,300 feet in 44 seconds. The flight speed is:

$$\frac{3,300 \text{ FEET}}{44 \times 1.47} = 51 \text{ MPH}$$

5. The application speed should be within 5 percent (plus or minus) of the calibrated speed. If the application speed is outside of the allowable range, request the pilot to correct his flying speed.
6. Use observation helicopter air speed indicator. Use formula above to determine accuracy or establish correction factor.

Characterization

Characterization is the evaluation of the spray droplet size.

This is accomplished through the following procedure:

1. Calibrate the aircraft as to flow rate and swath width.

2. Layout Spray cards at intervals of 10 feet perpendicular to wind direction.
3. Mark center line and start a smoke bomb.
4. Aircraft flys into wind across card line, speed is measured with a radar gun.
5. After 5 minutes, the cards are picked up and read using D-Max method.

II. DURING SPRAY OPERATIONS

The operations unit, using all available support services will issue a daily spray plan which will contain complete instructions for every phase of the days spraying operation. During the course of the spray operation this information will be relayed to the application teams on a daily basis. The projections for a typical spray day, following the issuance of a daily spray plan, can be described in the following manner:

TYPICAL SPRAY DAY

1. Abbreviations for Personnel

- | | | |
|--|---|---------------|
| a. Air Operations Manager | - | (A.O.M.) |
| b. Application Team Leader | - | (A.T.L.) |
| c. Aerial Observer | - | (A.O.) |
| d. Load Checker | - | (L.C.) |
| e. Spray Assessment Coordinator | - | (S.A.L.) |
| f. Spray Assessment Group Leader | - | (S.A.L.) |
| g. Spray Card Checker/Weather Observer | - | (S.C.C./W.O.) |
| h. Ground Observer | - | (G.O.) |

2. One Hour Before Sunrise

- a. A.O.M. - At office or in field with crews as needed.
- b. A.T.L. - At heliport or airstrip
 1. Checks radio communications with headquarters, A.O. and G.O., asks if in place and ready.
 2. Take and record weather.
 3. Determine if weather conditions are acceptable.
 4. Performs visual checks on spray equipment and batch trucks for leaks, clean, etc.

5. Provides necessary security and safety needs for heliport (brief personnel at heliport about safety - put up barriers, etc. as needed).
 6. Prepare necessary forms for the days operations.
 7. Has necessary safety gear ready to put on (Safety vest, etc.)
- c. A.O. - At observation heliport
1. Quick appraisal of observation helicopter and pilot.
 2. Brief pilot of days duties and hazards.
 3. Insures helicopter is fueled and ready.
 4. Insures Load Calculation forms are completed.
 5. Check hour meter reading. (Hobbs)
 6. Last min-preparation for flight, spray blocks, critical areas and hazards.
- d. L.C. - At heliport or airstrip
1. Does quick visual appraisal of application aircraft for any abnormalities. This includes inspection of application system (quick dump nozzles, etc.).
 2. Checks batch truck for abnormalities or leaks.
 3. Checks batch truck meters for any abnormalities.
 4. Insures pesticide is turned over-once (Mixing will be done with by-pass agitation.)
 5. Assist A.T.L. in preparing heliport for safety, etc.
 6. Check application aircraft numbers and prepare necessary forms for the day's work.
 7. Check and record meter readings before any pesticide is loaded on helicopter.
 8. Have necessary safety equipment ready to put on - (vest, goggles, etc.)
 9. Have weather readings for A.T.L.
 10. Continues taking weather every 15 minutes and records it on the weather forms.

e. G.O.

1. At observation location and has first weather reading recorded and ready to relay to ATL on request.
2. Takes weather reading every 15 minutes and records it on appropriate forms.

f. S.C.C./W.O.

1. Has all necessary card lines out and ready in blocks that will be sprayed in the first two hours of spraying.
2. Are enroute to additional locations as needed (road block or other card sites).
3. Takes and records weather - relay weather to ATL on request. This will be done at 15 minute intervals throughout the spraying operations.

3. Thirty-five Minutes Before Sunrise

a. A.T.L. - At heliport

1. Checks radio communication with observation helicopter.
2. Re-checks everything before a final "GO" operation.

b. A.O. - In observation ship

1. In helicopter and checking communications with A.T.L. and spray helicopter.
2. Readying for take-off.
3. Take power check on first flight each morning, records and calculates if OK.

c. L.C. - At batch truck on heliport or Airstrip with safety gear

1. Reads meter prior to helicopter being loaded.
2. Ready for "GO" for spray operation start.

d. S.C.C./W.O.

All cards in place, continues taking weather, blocks road if necessary and position themselves such as to best assist Aerial Observer.

4. During Spray Operations (Starts 30 minutes before sunrise)

a. A.O.M. - Observe daily spray operations.

b. A.T.L. - At heliport, airstrip or in spray blocks.

1. Maintains Heliport or airstrip safety!
2. Recording necessary radio communications
3. Oversees all personnel on that operation (A.L., L.C., or others at heliport or airstrip that are other than contractor personnel).
4. Notify A.O. if significant change in weather.
5. Make final determination if spraying is to be discontinued.

c. A.O.

1. Check aerial application for height, speed, spray patterns, overlap, area coverage, hazard areas, critical areas, spray behavior, and boom time on for in-flight calibration (stop watch).
2. Communicate with application pilot when needed to correct any problems that may occur.
3. Be aware of fuel in observation helicopter, pilot fatigue, or any abnormality that might appear.
4. Pass any information to A.T.L. of malfunctioning nozzles or other problems that may occur.
5. Let A.T.L. know when application aircraft is returning to heliport or airstrip.
6. Notify A.T.L. which block the application Aircraft is spraying and when block changes are made (A.T.L. will relay information to L.C.).
7. May use direct communication with G.O., S.C.C./W.O. when weather becomes critical factor.

d. L.C. - At heliport or airstrip

1. Assists A.T.L. in safety and other duties on heliport.
2. Reads meters and records pesticides loaded on each application aircraft.
3. Records take-offs and landing of each.
4. Record block weather that is called in.
5. Record weather every fifteen minutes and notify A.T.L. if weather changes are significant (Temp. raises 5 deg. in 15 minutes).

e. S.C.C. -

1. Continues taking and recording weather every 15 minutes. Prepares for future card lines or assists in blocks roads. Maintain communications with application team and spray assessment group leader or base.

f. G.O.

1. Positions self to visually watch the spray operation and still take and record weather in block at 15 minute intervals (more often if needed).

5. After Spray Operations are Over for the Day

a. A.O.M. (at office) -

1. Gather information on blocks sprayed (gallon/block, acres/block, etc).
2. Insure block information is posted and overhead personnel notified of progress and the next day projection.
3. Meet with contractors representative to determine next days projections (information may come in through A.T.L.).
4. Meet with A.T.L., A.O. etc. to determine if anything needs to be changed (this may not be needed each day).
5. Be available for any questions, comments, thoughts, theories, etc. that operational people may have.
6. Check to see if spray deposit cards have been analyzed.
7. Make sure that all information is available to field personnel to keep them updated.
8. Make up information board in office to inform personnel of on-going events.
9. Make sure vehicles are ready for the next day.
10. Make sure everyone is in from the field, everyone has knowledge of the next days activities and everyone has posted their time for the day.

b. A.T.L. (at heliport or airstrip)

1. Notify headquarters (A.O.M.) that spraying has stopped for the day - what blocks were sprayed, gallons sprayed/block, acres sprayed/block, and anything else pertinent.
2. Communicate with A.O. and A.O.M. to determine blocks to be sprayed the next day.

3. Notify ground crews (L.C., S.C.C./W.O.,G.O.) that spraying is finished for the day.
4. Notify S.C.C./W.O. of areas and blocks sprayed for the day.
5. Meet with application personnel to determine needs for next day.
6. Have a tailgate Safety Session.
7. Meet with necessary crew members to explain next days work (heliport, office or wherever).
8. Complete necessary paperwork, gather necessary paperwork from field personnel (L.C. forms, daily diary, etc.) and file appropriately.
9. Post next day's projected work schedule at office.
10. Read information board in office.
11. Make sure vehicles, etc. are ready for the next day.
12. Make sure A.O.M. has knowledge of the following day's activities for each person.
13. Make sure everyone has posted their time for the day.

c. A.O. - (Infield and Office)

1. Communicate with A.T.L. to determine the next days projected work.
2. Get with application pilots to insure their maps and/or photos are the best up-to-date available with hazards, critical areas, Class I streams, and boundaries marked out distinctively.
3. Recon the next days projected work area pointing out critical areas, Class I streams and spray block boundaries.
4. Fill out all necessary paperwork for observation helicopter and application project (including Tack hrs./day/ob. pilot).
5. Fill in areas completed on designated map in office.
6. Read information board in office.
7. Get prepared for the next day (vehicles, etc.).

d. L.C. - (Infield)

1. Calculate amount of pesticide used that day by block and ship. Give forms to A.T.L.
2. Get with A.T.L. for next day's projected needs.

3. L.C. will be pilot car driver for all moves of the batch truck (between heliports or for any batching material).
4. If batch truck takes on more pesticide, make sure mixing and necessary paperwork is done properly.
5. Read information board in office.
6. Get prepared for the next day (vehicles, etc.)
7. Complete all weather forms and give them to A.T.L.

e. G.O.

1. Continue taking weather a minimum of 1/2 hour after stop spraying.
2. Contact ATL for next days operation and tailgate safety session.
3. Give ATL written weather information on each block.
4. Knows ground observation locations for the next day and is able to find them in the dark.
5. Reads information board.
6. Readies vehicle for the next day.

f. S.C.C./W.O. - (Infield and Office)

1. Coordinates with ATL for the next days operation plan.
2. Communicate with S.A.C. on blocks partially completed or wholly completed for determining the time of pick-up.
3. Pick up spray cards and determine their effectiveness. (Do not pick up cards until they are dry - unless moisture threatens.)
4. Deliver cards to S.A.L.
5. Indicate on appropriate maps in office the location of the card plots.
6. Get instruction from S.A.L. or areas to be sprayed the following day.
7. Know where card plots and weather taking locations will be for the next day and mark cards accordingly.
8. Read information board in office.
9. Make sure vehicles are ready for the next day.

SPRAY STANDARDS

The following standards are to be used by all Application Team Leaders to determine when spraying operations should be suspended. Any variations of these standards, both more or less stringent, must be approved by the Operations Manager.

STANDARDS

While it is important to the overall success of the Project that every Application Team follow the standards for when to spray or not to spray, it needs to be remembered that many of these standards will require a large amount of Professional Judgement before a decision can be made. The goal of these standards are to set the stage so that the same criteria is being used by everyone to make the go or no-go decision.

I. WEATHER

Moisture, wind, humidity, air temperature, and ground temperature are all important factors that affect spray drift and the upward rising of spray droplets.

A. Wind

Maximum allowable wind speed is six (6 M.P.H.). No spraying should be attempted or all spraying should cease if wind speeds are in excess of this within the spray block.

If the application helicopter pilot is unable to compensate for spray drift caused by increasing wind speeds or if wind speeds will cause drift into off target areas, spraying should stop.

B. Moisture

1. Fog

No spraying should occur when fog or low clouds cover the area to be sprayed. This is a potentially dangerous situation.

2. Dew

Spraying may occur when the foliage is damp or wet (also see the section on Rain) so long as the foliage is not so wet as to be dripping. This condition will mainly exist in the early mornings.

3. Rain

No spraying will take place if it is raining or if the forecasted weather predicts rain within twelve (12) hours of the spray application. As described in the section on Dew, if it has rained previously to the start of the spray application and the foliage is not dripping, spraying can continue.

C. Humidity

No spraying will occur if the humidity within the spray block drops below a minimum of fifty (50) per cent. Conditions may exist that will cause a rapid decrease in the humidity in a very short time span. If this occurs, and it is detected that the spray droplets are not getting to the ground, cease spraying until the condition stabilizes. If, after stabilization, the humidity is above 50%, spraying may resume.

D. Temperature

All spraying will stop when the air temperature at application altitude reaches seventy (70) degrees. Application altitude is the temperature at the altitude of the application helicopter.

If the application altitude temperature is warmer than the surface temperature (even if it is not 70 degrees), the spray will begin to "hang". From the side, the spray will have a "camel back" appearance. Spraying should stop if this condition exists.

If the surface temperature rises faster than the application altitude temperature an up draft will occur causing the spray to raise. This will be especially evident on southern exposures and dark terrain features early in the morning. If this condition exists, stop spraying in this area and, if possible, move to another portion of the spray block.

Inversions - An inversion is where cool air is trapped at the surface up to a certain altitude where it is covered by a layer of warmer air. It is not a problem if the application helicopter can work in the area of cooler air. If the application helicopter can not work in the lower area, the spray will not be able to penetrate the cooler air mass and will hang and drift off target. Suspend spraying if this condition exists but continue to monitor surface and application altitude temperatures. Inversions have a habit of breaking down rapidly which may present another opportunity to continue spraying.

II. IRREGULAR SPRAY

A. Spray Droplets

1. Droplet Size - The specified droplet size is approximately 125-150 microns. If they are too small or too large, a problem exists and spraying should stop until it is corrected.
2. Droplet Dispersal - The goal is to get 20 drops per square centimeter. Weather conditions will usually be the cause of this problem if there are too few drops. There could also be mechanical problem with the application helicopter (like a clogged nozzle). Stop spraying if this condition exists.

Note: The S.C.C./W.O. AND G.O. will be the best source for this information.

B. Condition of B.t.

Improperly mixed B.t. will have a great impact on the type of spray received. If it is suspected that the B.t. being used is contaminated in any way, suspend the use of that batch. Get another batch and resume spraying unless directed otherwise.

III. MECHANICAL CONDITIONS

A. Aircraft

Suspend spraying activities if any of the following conditions exist:

1. Mechanical problems.
2. Poor operating spray system
 - a. Plugged nozzles
 - b. Leaking system
 - c. Non-operating quick dump (unless loaded is calculated for noneject load).
 - d. Non-functioning meters and/or gauges
 - e. Communications problems
 - f. Pilot condition

B. Batch Trucks

If there is only one batch truck present, suspend spraying activities if any of the following condition exist:

1. No Batch
2. No Operator
3. Non-functioning meters
4. Leaking system
5. Non-operating pump

C. Personnel

Suspend spraying activities if the following personnel are not present or nonfunctional:

1. Observation Pilot
2. Application Pilot
3. Aerial Observer

4. Load Checker unless duties can be performed by the Application Team Leader.
5. Batch Truck Operator
6. Fuel Truck Driver

IV. SENSITIVE AREAS

A. Organic Farms

Avoid flying over these areas unless spraying. Suspend spraying adjacent blocks when weather conditions exist which will cause drift into these areas.

B. Animals

Avoid flying over areas identified as having horses, turkeys, or other exotic or timid animals while not spraying.

C. Special Considerations

Suspend spraying over areas containing large numbers of people outside. Included here are such things as: sporting events, golf courses, schools, etc. Spraying may resume if approved by the Operations Chief.

D. Protestors

Suspend spraying in any situation where there is any threat to safety. Spraying may continue only if no safety threat is present.

OREGON FOREST PRACTICES ACT ALTERNATE PLAN

OBJECTIVE

The objective of this alternate plan is to provide alternate practices in the application of Bacillus thuringiensis (B.t.) for this project to meet or exceed the Oregon Forest Practices Act.

OAR 629-24-102 states, "Practices contained within a rule shall be complied with where applicable or necessary to accomplish the purpose to which the rule is related, unless the operator or landowner has secured written approval from the State Forester of a plan for an alternate practice or practices which provide for equivalent or better results."

BACKGROUND

Approximately 430,000 acres in Grant and Harney County to be sprayed with the insecticide B.t. for eradication of the gypsy moth. The B.t. is a naturally occurring bacterium commonly found in the environment. It is the active ingredient of several commercial formulations and trade names. For this will be used and is registered for control of the WSBW.

B.t. acts specifically against many species of Lepidopterous larvae. Its mode of action is as a stomach poison which causes cessation of feeding. Tests have shown that it is not phytotoxic and has no toxicity to predators, parasites, mammals, birds or fish. The formulation is no label restrictive to prohibit its application over water.

Project personnel and representatives of the Oregon Department of Fish and Wildlife met on April 8, 1986 to review the possible impacts on fish and wildlife as a result of the spray project. Agreement was to treat all wildlife habitat in the project area with B.t. Disturbance of the wildlife will be kept to a minimum. Special considerations will be taken when spraying around fish hatcheries. Treatment of Bald Eagle habitat areas will be to provide a 1/2 mile unsprayed buffer around each active nest.

PROPOSAL

The W.S.B.W. Spray Project is scheduled to be conducted between May 20th and July 15th, 1987. Therefore, approval is requested for this alternate plan covering the following specified rules:

1. OAR 629-24-200 states, "Chemicals perform an important function in the growing and harvesting of forest tree species. The purpose of these rules is to regulate the handling, storage, and application of chemicals in such a way that the public health and aquatic habitat will not be endangered by contamination of waters of the State."

Guidance: The FPA rules define "contaminate" as ". . . the presence in the atmosphere, soil or water of sufficient quantities of chemicals as may be injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, or recreational uses, or to livestock, wildlife, fish or other life."

Studies have determined that B.t. has no adverse health effect on human or like forms other than the larvae of Lepidopterous species when properly applied according to the registered label.

Approval is requested for aerial application by Aircraft of B.t. onto sensitive areas, such as houses, parks and wildlife habitat. Bald eagles will be protected with a 1/2 mile untreated buffer around each nest.

2. OAR 629-24-203 states, "Protect waterways and areas of open water such as swamps and impoundments from contamination when spraying by aircraft by leaving a buffer strip of at least one swath width untreated on each side of every Class I stream or areas of open water."

B.t. has been determined by studies to have no adverse effects when applied over waters.

Approval is requested to apply B.t. aerielly by Aircraft on buffer strips by flying parallel to the Class I streams. There will be no direct application of B.t. to the waters of Class I streams.

3. OAR 629-24-205 states, "Apply chemicals only in accordance with currently recognized limitations of temperature, humidity, wind and other factors specified by the State Forester."

One of the weather limitations by the State Forester is that spraying will not occur if the winds exceed 6 miles per hour.

The 1987 USDA W.S.B.W. Project Environmental Impact Statement has determine that effective aerial application of B.t. can be made in winds up to 6 miles per hour.

REPORTS AND RECORDS DISTRIBUTION

Application Daily Flight Record

Distribution: Operations File by Team Leaders
Completion: Load Checker
Due Time:

Batch Truck Log

Distribution: Air Operations Manager
Completion: Load Checker
Due Time:

Daily Accomplishment Record

Distribution: Operations File Chronologically
Plans
Completion: Dispatcher
Due Time:

Daily Aircraft Record

Distribution: Pink - Pilot
White - Operations Manager (for Contract)
Yellow - A.T.L. keeps
Green - Operations file by Helicopter
Photo - Copy to Plans
Completion: Team Leaders
Due Time:

Daily Diary

Distribution: Operations File by Team Leader
Copy to Plans
Completion: Application Team Leader, Aerial Observer
Due Time:

Daily Radio Log

Distribution: Operations File Chronologically (by Unit)
Completion: Dispatcher
Due Time:

Projected Spray Plan

Distribution: Operations File Chronologically (by Unit and A.T.L.
and Plans, all departments)
Completion: Operations Section (A.T.L. and Ops. Manager)
Due Time:

Field Weather Report

Distribution: Operations File by Team Leader
Completion: Ground Observer, Spray Assessment/Weather Observer,
Load Checkers, Team Leaders
Due Time:

Flight Duty Log Book

Distribution: Own File - Operations
Copy to Plans
Completion: Air Observer
Due Time:

Flight Use Report

Distribution: Yellow copy with book in helicopter
Pink copy to pilot
White to Operation Manager (Contract)
Photocopy to Plans
Photocopy to Oper. file (by date)
Completion: Air Observers
Due Time:

Heliport Safety

Distribution: Operations File by Team Leader
Copy to Safety
Copy to Plans
Completion: Team Leaders
Due Time:

Load Calc

Distribution: White Copy to Operations File by Helicopter
Completion: Air Observer
Due Time:

Power Check

Distribution: Operations File by Helicopter, and Graft points
in Powerchart Notebook
Completion: Air Observer
Due Time:

Spray Assessment Form #1

Distribution: Spray Assessment File No., Photocopy to Operations
File by Helicopter, Photocopy to Plans
Completion: Spray Assessment Group and Ground Observer
Due Time:

Spray Deposit Assessment Daily Summary Form #2

Distribution: Operations File by Helicopter
Completion: Spray Assessment Leader

Due Time:
Tailgate Safety

Distribution: Operations File by Team Leader
Copy to Safety
Completion Team Leaders
Due Time:

Calibration of Rotary Wing - Liquid

Distribution: Operationsl File by Helicopter and A.T.L.
Completion: Person in Charge of Characterization and
Calibration
Due Time:

Aircraft Calibration Sheet

Distribution: A.T.L.'s and Operations File by Aircraft
Completion: Person in charge of Characterization and
Calibration
Due Time: Immediatley After Aircraft Acceptance

Aerial Observer Report

Distribution: Operation File by Spray Block
Completion: Aerial Observer
Due Time:

Batch Truck Inspection

Distribution: Operation File Under Batch and Fuel Trucks
Completion: By Person in Charge of Batch Truck Inspection
Due Time: Before Truck Comes on Project

Search and Rescue Information Report

Distribution: Operations Search and Rescue File, Copy to Needing
Agencies
Completion: Dispatcher
Due Time: Emergency Situations

HELIPORT OR AIRSTRIP PRE-FLIGHT CHECKLIST

Report by: _____

Date: _____

Heliport Location: _____

Aircraft Registration Numbers: _____ Spray Ship(s): _____

Observer Ships: _____

On Aircraft:

- _____ Check seating of trap-door on insecticide tank. ("Quick-Dump Door")
- _____ Check plumbing joints for leaks on all boom parts -especially those parts closest to the ground. (Visual check)
- _____ Make sure a guard is in place of the "quick-release" switch.
- _____ Make sure drain on insecticide tank is closed. (Previous day's operation may have left it open after tank was cleaned.)
- _____ Know maximum tank loads. Monitor to prevent overloads.
- _____ Aircraft is free of loose items. (tools, windex, rags, etc.)

On Tank Trucks:

- _____ Visually check fuel truck for leaks. (Hose, fittings, tanks.)
- _____ Inspect batch covers on nurse-trucks and batch trucks. Covers must be secured prior to moving trucks form landing or from batch area.

On Landing and Airstrip:

- _____ Heliport or Airstrip is clear of loose items and debris.
- _____ Tailgate safety meeting or equivalent was held to remind team members of specific concerns. Must be documented daily and submitted to Safety.
- _____ Check radio communications with base camp.
- _____ Application Team Leader has radio communications with Aerial Observer.
- _____ Aerial Observer has radio communications with spray ship pilot.
- _____ Spill containment equipment is on landing prior to any fuel or insecticide handling.
- _____ "People barriers" are in place where needed to separate the public from hazards.
- _____ Contractor and project personnel at this location appear alert and ready for day's operations. (Pilots, tank-truck drivers, service personnel).
- _____ Vehicles are parked to prevent conjection at heliport or Airstrip.
- _____ Personal protective gear is in use.
- _____ Pilot and Aerial Observer briefed of hazards.

NOTE: This checklist is to be completed each morning by each team. Many of these items will need to be monitored throughtout the operation time period. Submit a Xeroxed copy of completed form to Safety Section.

AIRCRAFT CALIBRATION SHEET

Aircraft "N" Number N _____ Date _____

Aircraft Type _____ Pilot Name _____

Aircraft Model _____ Contractor _____

Aircraft Speed _____ B.t. Formula (A) _____ (B) _____

Swath Width _____ (C) _____ Other _____

Number of Nozzles _____ Discharge/Minute _____

Type of Nozzles _____ Discharge Nozzles/Minute _____

Helicopter Wt. _____

Maximum Allowable Payload by Elevation: Alt. _____ Gal. _____

Alt. _____ Gal. _____ Alt. _____ Gal. _____

Alt. _____ Gal. _____ Alt. _____ Gal. _____

Problems With Calibration and Characterization: _____

Additional Comments: _____

SPRAY DEPOSIT GUIDELINES

I. Card Lines

A. REQUIREMENTS

Spray cards will be used to assess quality of treatment during the entire project. Spray cards are intended to monitor the contractor's ability to properly apply B.t. at 12 and 16 BIU's at 96 and 64 fl. oz. per acres. Realizing the size of the project and limited accessibility and funds, random card lines will be placed in each spray block. Spray blocks will range in size from 250 to 5000 acres and will have a minimum of one card lines in each block, with an optimum of three and a maximum of four card lines.

Card lines will consist of twenty cards, spaced fifty feet (50') between cards. The card line will be laid out in an "L" shape, placing 10 cards in a straight line, then a right angle (90 degrees) and the other 10 cards. Without prior knowledge of spray ship's flight patterns, it is necessary to have card lines placed in two different directions.

B. LABELLING CARDS

All cards will be labelled prior to spray deposit. Cards will be labelled and dated on the bottom center of card on the same side to be treated. All cards will be labelled with the unit, block, card line, card number and date information. The card labelling scheme is:

7-2-1 (4/30), 7-2-2 (4/30), 7 2-3 (4/30),7 2-20 (4/30)

K7 - 2-20 (4/30)

Spray Unit	Spray Block	Card Line	Card #	Date
K-King			7	
20	6-10-87			

C. LOCATION

Card line locations will be determined at least one day prior to treatment. These will be exact locations plotted on both the transportation map and the 7 1/2 min. quad map. Random card line locations will be known only by card crew personnel. Card line locations will be drawn on the back of each Spray Deposit Assessment Form. The maps will be easy to read, large enough scale to include enough detail that any project personnel can return to the site. Card line maps should include obvious land marks, north direction, road to card line and any other helpful information.

A major key to a successful pesticide application is the termination of the days treatment at the time the spray material begins to "hang up" in the air and not reach the intended target. An opportunity exists to assist the Aerial Observer and Application Team Leader in making the daily decision to stop application for the day.

When the A.O./A.T.L. feels the application is nearing shut off time, the A.O. will radio to the assigned card crew instructions for placement of a quick card line. This card line will be placed in a strategic location known to the A.O. After cards have been passed over by the spray ship and time has been allotted for droplets to reach the spray cards, the card crew will read the cards and

report back to the A.O./A.T.L. This team effort will improve spray behavior understanding and be an effective means of determining if and when application should be terminated for the day.

Card crews should become familiar with card line locations, be able to find the card lines in the dark, consider safety hazards and the time required to place cards in the early morning prior to treatment.

D. PLACEMENT

All cards will be placed in plastic card frames and placed on wire supports. This will keep the cards flat and above the grass and low shrubs. Card lines will be placed in relatively open areas, not under an overstory canopy, under trees, next to buildings, in large (greater than 200 acres) grass/clover fields or in any other area likely to not be treated. The idea is to get an honest sample of spray deposit from which a meaningful assessment can be made. Try to place cards in locations that makes them difficult to see from the air, which often isn't possible. Keep card lines well inside known spray block boundaries.

Additional card lines may be placed in other areas of concern such as areas scheduled for an aquarius treatment of B.t., buffered areas or areas outside of proposed treatment areas.

E. COLLECTION

After completion of the day's spraying or completion of spray block the spray cards will be collected no sooner than 1/2 hour after treatment and no later than 3 hours after treatment. Cards will be collected in such a manner as to not disturb spray deposit. Proper method is to carefully remove card from its plastic frame and insert card into a separate slot in the card collection box, keeping cards in their proper order. Cards can be placed back to back, two cards per slot if more space is required in card box. Card boxes should be covered to insure dust or moisture does not reach the cards while being transported for examination. While in treated areas after treatment, observe foliage, rocks, etc. to get a rough determination how well the area was treated.

SPRAY ASSESSMENT GUIDES

II. Spray Deposit Guidelines

A. Initial Examination

The first check of spray cards is to determine if there is any spray deposit apparent. This will be recorded on the Spray Deposit Assessment Form #1. This check may be done with either the naked eye or with a hand lens. This is a quick check just to see if the card line received spray deposit and if any major skips occurred.

B. Density Determination

Density determination will be done on all treated random card lines. Due to the total number of cards, a sub-sample of the total card line will be measured for spray droplet density per square centimeter (/cm²).

After the card line has been retrieved, remove cards from slot in card box and read cards to determine droplet density. Whenever possible, read cards in field prior to returning to headquarters to expedite daily spray card information, so the information can be used effectively that day.

Alternate procedures to measure droplet density (depending on what we finally decide on).

The 1987 W.S.B.W. Project will use Alternate #4.

Alternate #1

1. Overlay templates with predetermined square centimeter cut out on to the spray card.
2. Using a hand lens or magnifying lens count every drop inside the square centimeter.
3. Examine this square very carefully and accurately.
4. Record this total on the Spray Deposit Assessment Form #1 for the appropriate card number.

Alternate #2

1. The clear acetate spray card will be overlaid on a dark smooth surface background (construction paper) with a premarked square centimeter.
2. Same as Alt. #1 - 2.
3. Same
4. Same

Alternate #3

1. The clear acetate spray card will be overlaid on a dark smooth surface (construction paper) with 3 remarked centimeter squares for a random average of the spray card.
2. Same
3. Same
4. Same

Alternate #4

1. Rate the deposit on the spray card in one of the following four categories:

Class 0 - no deposit on card

Class 1 - Very light deposit; count

all drops on card,

then

divide by _____.

count all drops on the
large square, then divide
4.

Class 2 - moderate deposit;
(has drops, but not distributed
on card) by

count all drops in

Class 3 - obvious adequate deposit;
the square centimeter.

2.

Same

3.

Same

4.

Same

C. Validation

Accepting the fact that counting droplets per square centimeter by hand lens or naked eye isn't 100% accurate, a subsample of spray cards will be recounted using a dissecting microscope. This will be done to insure the margin of error is within tolerable limits. Those readings will be reported when the limits are not met.

D. Data Summaries

After card line data has been recorded on the Spray Deposit Assessment Form #1 a summary for the day's spraying will be done as soon as possible on the Spray Deposit Assessment Daily Summary Form #2. This will be posted so Application Team members and Operations Chief and Assistant can be informed on a current daily basis of the day's results.

An additional cumulative record will be kept to show spray deposit by application, tail number and total project using a computer program.

1987 WESTERN SPRUCE BUDWORM PROJECT

ENTOMOLOGICAL PLANS

ENTOMOLOGICAL PLAN

1987 Western Spruce Budworm Suppression Project

Suppression of the western spruce budworm with the nonpersistent insecticide Bacillus thuringiensis (B.t.) requires careful timing of the application to coincide with the appropriate developmental stage of the insect targeted for suppression. Development of budworm through the juvenile stages progresses quite rapidly. During the third- through sixth-instars, budworm larvae feed openly on foliage as it unfurls and the shoot elongates. Application of insecticides during this stage of host phenology insures the availability of sufficient needle surface area upon which the insecticide can impinge. Since pathogenicity of B.t. requires that a lethal dose be consumed by larvae, we are targeting primarily the development stage that will consume enough treated foliage to produce mortality--fifth instars.

The pace at which the budworm advances is enhanced by favorable weather. Warm, dry weather, and especially warm nights, promote budworm feeding and increase metabolic processes that translates to a rapid rate of development. The period of time between instars may be only 3 or 4 days, under these conditions; hence, timing of applications is critical.

The optimum conditions for treatment, therefore, result in a fairly narrow Effective Spray Interval 1/. Treating too early could result in many individuals escaping exposure to B.t. because of feeding unexposed in swollen buds, or that the activity of B.t. is diminished by exposure to ultraviolet radiation from sunlight before the B.t. can be ingested by larvae. Spraying too late might result in avoidance of B.t. by those individuals which have advanced into the late sixth-instar and have ceased feeding prior to pupation.

Even with the best timing of spray applications, a certain number of individuals will escape mortality due to the range of instars represented, and differing host phenologies (as influenced by site, elevation, and other factors) over the spray block, at the time of application. In considering these factors, the Entomological Plan has been designed with various standards which we believe will: (1) insure that only those Analysis Units (AU) benefiting from treatment are treated; (2) insure that spray blocks qualifying for treatment are released for treatment to optimize the timing of insecticide application over most of the spray block; and (3) achieve budworm population reductions which meet or exceed objectives for the Project.

The Entomological Plan will require a number of types of sampling strategies to be used throughout the project to assess populations, time insecticide applications, and assess treatment effects. Each type of sampling will occur during specific phases of the Project.

1/ Effective Spray Interval - that interval, expressed in days, during which an insect is in a stage of development determined to be optimal for producing an insecticide-caused mortality by application of a given dosage of a specific chemical or biological agent; independent of weather or any other factor that might affect application.

EARLY LARVAL DENSITY SAMPLING

Objectives

Population sampling will be used early during the insect development to estimate population densities for the purpose of qualifying each Analysis Unit for treatment. This sampling strategy will determine the need for treatment as well as distinguish those Analysis Units which, because of low insect populations, will be excluded from treatment.

Qualifying Standard

Larval density sampling resulting in a minimum of four larvae per branch, averaged over the entire Analysis Unit, will qualify the Unit for treatment. Analysis Units averaging larval densities less than this will not be treated.

Timing

Because timing of the insecticide application will be critical due to the narrow Effective Spray Interval, sampling will be scheduled to qualify Analysis Units as early as possible. Sampling will commence during bud swell, at the beginning of budburst when most larvae are in third- and fourth-instars. This is estimated to be at the end of May or by the first week in June.

Sampling Plan and Procedure

Each Analysis Unit will be divided into spray blocks within which host trees are sampled to insure that larval densities represent the range of densities over the entire AU, and that any decision to qualify or disqualify an Analysis Unit will be accurate.

The design of Early Larval Density Sampling makes use of multiple-stage sampling statistics in the form of a three-stage design. The three stages of the sampling design are: sample plots--first stage; trees within plots--second stage; and branches within trees--third stage. A computer program (MUST) for Multi-Stage Sampling (Hazard and Stewart, 1974) was used to evaluate prespray budworm larval densities from the 1983 and 1985 budworm suppression projects. This analysis provided estimates of budworm population variances between branches, trees, and plots, as well as costs to obtain samples at each of these stages, to calculate the optimum allocation of sampling effort to each stage for the 1987 project. The optimum allocation of sampling among sampling stages was computed to minimize the sampling error for the costs expended to sample each stage. The results of the MUST analysis provided a sampling design that permits the estimation of prespray density mean over the AU at a level of precision of 15 percent (Sampling Error = +/- 0.15) and with a 95 percent probability that the true mean will fall within the sampling error ($P = 0.05$). The optimum allocation of sample size or number for the three sampling stages of the 1987 project is given in Appendix A. Sampling locations may be the same as those established for development sampling, discussed in the next section. Plots must be distributed across the AU.

The sample trees at each plot will consist of three Douglas-firs or three true firs. The trees will be open-grown host trees with bud-bearing branches in the mid-crown, 20 to 30 ft. tall, and exposed to full sun most of the day. The predominant species component will be favored for this sample; but, in mixed composition stand situations, at least one of the sample plots will be of the

minor species component. For blocks containing more than three plots, the number of major and minor component plots will be similar to the proportion of major and minor host species occurring over the spray block. The Project Entomologist or Assistants to the Project Entomologist will determine the proper mix of major and minor component plots for each spray block.

A branch sample will be obtained from the mid-crown of each sample tree by clipping one 45-cm (17.7-in.) apical branch from the crown (1 branch per sample tree) with a pole pruner and collecting it in the cloth catch-basket attached just below the cutting head. Branches will not be trimmed if they are longer than 45-cm, nor discarded if they are shorter. Extra branches will be taken only if a sampled branch has no live buds. Each branch plus any larvae that have fallen into the basket will be placed in a paper bag along with a Field Data Collection Slip (pink copy of Biological Form No. 1, Appendix B) showing sampling location information e.g., block number, plot number, tree number, collection date, and other information as required. The top of the bag will be folded over twice and stapled shut to prevent escape of larvae. The date and plot number will be written on the outside of the bag. The four bags from each sampling location (plot) will then be stapled or bundled together, placed in a cardboard box labeled on the outside, and transported to the laboratory. If certain AUs marginally meet the qualification standard due to lack of dispersal of overwintering larvae, or because the larvae may still be in diapause, the plots should be revisited in 3 or 4 days (or less if weather is particularly warm and dry), and the trees remeasured for larval density.

Sample Processing

At the laboratory, samples will be put into a walk-in cooler at 40°F until they can be examined. Each sample will be examined within 24 hours after collection or earlier. All budworm larvae will be collected, including those within unopened buds, mining in old needles, and those which have fallen or crawled off the branch and remained in the paper bag. The bag should be cut open and taken apart since some larvae migrate into the folds. A glass vial will be labeled for each branch sample, and all larvae from that branch placed into the vial and preserved in 70 percent alcohol. All budworm larvae will be examined by the Project Entomologist or other qualified person for instar determinations. The number of larvae in each instar and number of pupae will be recorded for each sample tree on each plot within a treatment block. Also, the number of open and closed buds will be recorded. Information will be recorded on the Early Larval Density Data Sheet (yellow copy of Biological Form No. 2, Appendix B). This data will be used to determine early instar larval densities for the Analysis Units. If a unit is borderline for qualification, more density estimate samples will be taken from the unit to help in making a decision. The recommendation for treating an Analysis Unit or withholding a Unit from treatment will be transmitted in writing by Project Entomologist to the Project Director via U.S. Department of Agriculture Form AD-311 (Speed Memo).

ADP Entry and Report Generation

Information from the Early Larval Density Data Sheet will be entered into the Data General Computer database file "EDENSITY," using the Forms Entry System (FES). Data must be entered the same day as samples are processed. A folder will be specified for each project area, and data should be entered only in the

database established for the location or project area from which it was collected. For example:

<u>If the project area is located:</u>	<u>The folder is:</u>
At Rimrock Lake (Wenatchee NF)	RIMROCK
North of John Day (Malheur NF)	J.D.NORTH
South of John Day (Malheur NF)	J.D.SOUTH

The database resides in the Drawer "SBW."

The database is maintained as a multiple record data file and is used in conjunction with the Western Spruce Budworm Decision System (WESTBUDS). The System consists of a number of FORTRAN computer program modules that evaluate and summarize the database records, and writes a report which, in this case of the Early Density module, displays the average budworm densities plus 95-percent confidence limits on all spray blocks.

This program module has been designed to provide the Project Entomologist with a decision tool that, in conjunction with sound professional judgement and experience, can be used to make recommendations to the Project Director with respect to qualification of Analysis Units for treatment. The program will be accessed through the Ft. Collins Computer Center (FCCC) and run either interactively or by batch process. Details for accessing and running WESTBUDS are covered in Appendix C. Because we desire to qualify Analysis Units as early in the Project as possible, timeliness of data entry and processing is essential to management of the Project. Accordingly, plot data should be entered promptly and the data set records transferred to FCCC daily to provide up-to-date information. The program should be run each day after updating the data set to obtain the current status of early larval densities over the AU. In addition to the ADP system described above, it is advisable to keep up-to-date charts and graphs as a supplemental and/or backup system. Some manual calculations of average densities and recordkeeping may be necessary if computer systems go down.

LARVAL DEVELOPMENT SAMPLING

Objective

The efficacy of the B.t. treatment depends, to a great extent, upon applying the correct dosage at the proper timing. The objective of the larval development sampling is to determine when to apply B.t. to each spray block so that the probability of larval mortality will be greatest. Spray blocks will be "released" for treatment when development sampling results indicate that budworm have obtained the optimal stage for treatment with B.t.

Release Standard

Spray blocks will be released for treatment when the Project Entomologist determines, through periodic sampling of budworm development, that approximately 95 percent of all buds have unfurled and approximately 50 percent or more budworm larvae are in the 5th-instar or later. It should be noted here, that percent of budflush (i.e. foliage unfurling or expanding and bud caps off) is merely a relative indicator of the availability of foliage surface area upon which the insecticide spray can be deposited. The importance of a flush of

foliage to the spray operation lies in the fact that the insect must feed on B.t.-treated foliage and ingest a lethal dose, for the treatment to work. If 2 percent or more of the budworm are found in the pupal stage, the entire block will be immediately released, regardless of larval development. If poor weather or operational problems result in delaying treatment and 5 percent or more of budworm within a block have pupated, the Project Entomologist will make a determination as to whether that block will be excluded from treatment.

Releasing of Blocks for Insecticide Treatment

The Project Entomologist will release each block for treatment as soon as the Release Standard is met (see above). In order for the treatment to be effective, the released block must be treated within 48 hours of being released. If treatment is delayed beyond this time due to unfavorable weather or other operational problems, the block must be resampled, and should be withdrawn from treatment if pupation averages 5 percent or more over the block. In some situations, the Project Entomologist may elect not to withdraw the block from treatment. When blocks must be resampled because of delays, the Project Entomologist will immediately notify the Project Director or Unit Supervisor of the results of resampling the block when additional sampling shows that insects are close to or starting pupation. Notification will be in person or by telephone, with a followup notice in writing.

All notifications of release of blocks for treatment will be made by the Project Entomologist to the Project Director or Unit Supervisor in writing on the Treatment Block Release Form (green copy of Biological Form No. 3, Appendix B).

Timing

Larval development sampling will begin in late May to early June. Development plots will be sampled intermittently until the buds begin to swell. At this time, plots will be sampled at least twice weekly until buds open and the foliage begins to expand. Depending on weather and rate of development, samples will then be taken as often as necessary and will continue until Release Standards are met for the block (i.e., 50 percent 5th-instar or later).

Sampling Plan and Procedure

The sequence of insecticide treatment on the spray blocks will depend upon the progression of larval development within each block. Block boundaries will be selected such that the difference in aspect and elevation will be minimized within each block. Normally, the elevation change within a block should not be more than 500 feet. This will help to minimize differences in larval development and phenological development within each block. Block size will range between 250 and 5,000 acres in size.

Larval development sampling will be done at three sampling locations within each block that have reasonable access. These sampling locations will be located such that they best characterize the range of both elevational and aspect differences within the block. Where access to a block or portions of it is very difficult, larval development will be assumed to be similar to that of nearby sampling locations at similar elevations and with similar aspects.

A minimum of 3 development plots consisting of 2 Douglas-fir or 2 true fir per plot, distributed over the entire spray block, will be sampled for insect development. Sample trees must conform to the same criteria established for the

Early Larval Density Sampling described in the previous section, but will be sampled in a different manner as explained later. Sample trees selected for development sampling must have abundant foliage with new buds in the lower crown, which can be reached from the ground without the aid of a pole pruner. It is especially important for the development sample, that both Douglas-fir and true fir be sampled on blocks where a host species mix occurs. This is because larval development rates may differ among host species that occur at the same location (Williams, et al., 1985). One exception to this is when only a few true fir species occur at elevations or slopes dominated by Douglas-fir. In these situation, only Douglas-fir hosts should be sampled; otherwise the host species component selection criteria used in the last section will apply here, as well.

It has been shown by Morris (1955) that correlation exists between successive spruce budworm population density samples drawn from the same trees; hence, from a statistical point of view, it is advantageous to resample the same development plot trees. Moreover, since an accurate chronological trend in budworm development can be obtained by periodically resampling the same trees, drawing successive samples from designated insect development sample trees makes biological sense, as well. For the larval development sampling, the designated sample trees will be resampled in accordance with timing of samples described above.

Development sampling will be similar to that described by Williams et. al., (1985). Samples will be obtained by clipping enough apical branch tips with developing shoot from the lower crown, to half-fill a size No. 1/6 paper sack. A separate sack will be used for each sample tree. Care will be exercised to minimize the disturbance of the neighboring branches on the sample tree, as they will likely be sampled during future visits to the plot during the development sampling. Disturbing these branches may cause large larvae to spin down from the branch with the resultant sample from that branch being biased towards less mobile smaller instars. A Field Data Collection Slip (Biological Form No. 1, Appendix B) showing sampling location information will be placed inside the sack, and the top of the sack folded over twice and stapled to prevent escape of larvae. The same collection information as on the slip will be written on a second slip and stapled to the outside of the sack at the top of the sack. The two sacks for each plot will be placed together in a cardboard box with other plot samples from the same spray block, for transport to the laboratory. The box will be identified on the outside with the block number and the date collected. If a visual inspection indicates that new buds have not yet opened in the lower crown, the sample tree or trees will not be sampled for development until the next scheduled visit. Since the treatment will be applied only when there is adequate foliage surface area for droplet deposition, it is unlikely that spray blocks with trees at this stage of phenology will be ready to treat for several more days. By not sampling plots having trees with tight buds in the lower crown, a great deal of sampling and sample processing effort can be saved. However, regardless of whether or not a plot is sampled for development, an estimate of percentage of bud flush in the upper-, middle-, and lower-third of the crown of each sample tree will be recorded on the Field Data Collection Slip, each time the plot is visited for development sampling.

Sample Processing

At the laboratory, samples will be put into a walk-in cooler at 40^oF until they can be examined. Each sample will be examined within 24 hours after collection or less. The numbers of both opened and unopened buds will be

counted and all budworm larvae collected, including those within unopened buds and those which have fallen or crawled off the branches and remained in the paper sacks. All larval are removed and put into a disposable plastic petri dish containing 70 percent alcohol. A separate dish will be used for each tree sampled. Each container will be labeled to identify the sampled plot, tree species, and collection date. All budworm larvae will be removed from the container, and examined by the Project Entomologist or other qualified person for instar determinations. After examination, sample will be discarded, and only the sample qualifying the block for release will be retained. The number of unopened buds and the number of individuals in each instar will be recorded for each treatment block on the Budworm Development Plot Data Sheet (white copy of Biological Form No. 4, Appendix B) for ADP entry. The Project Entomologist or an Assistant will graph the data that illustrates the percentage of individuals in 5th-instar or larger. All work will be completed before the Project Entomologist concludes the work day.

ADP Entry and Report Generation

Information from the Larval Development Plot Data Sheet will be entered into the Data General database file "Develop," using the Forms Entry System (FES). Data must be entered the same day as samples are processed. The location name will be specified for each project area, and data should be entered only in the database established for the location or project area from which it was collected. The folder name will be the same as for the previous section; that is:

If the project area is located:

The folder is:

At Rimrock Lake (Wenatchee NF)
North of John Day (Malheur NF)
South of John Day (Malheur NF)

RIMROCK
J.D.NORTH
J.D.SOUTH

As with the Early Larval Density database, the development database is maintained as a multiple record data file and is used in conjunction with WESTBUDS. The dataset records should be transferred to FCCC as soon as entries to the database have been made for the day. The Larval Development module is used to evaluate and summarize the database records, and write a report which sorts records on the basis of decision parameters to identify the spray blocks that are ready to release for treatment or to withdraw from treatment (see Appendix C for details in using the program module). Specifically, the report generated will display: (1) the percent of opened (unfurled) and unopened buds and proportion of larvae in the 5th-instar for each spray block along with 95 percent confidence limits; (2) spray blocks with 50 percent or more budworm in the 5th-instar or larger, and percent opened buds, by AU (i.e., those blocks which meet the insect development criterion for treatment, but not necessarily the phenological criterion for treatments); (3) spray blocks with 2 percent or more pupae, by AU (i.e., those blocks which must be released immediately for treatment irrespective of the proportion of individuals in other developmental stages on the block, nor of the percentage of buds which have unfurled); and (4) spray blocks with 5 percent or more pupae, by AU (i.e., those blocks which should not be treated due to the advanced development of the insect). This program module has been designed to provide the Project Entomologist with a decision tool that can be used to make recommendations to the Project Director with respect to release of blocks for treatment. To obtain current development on the spray blocks, the program should be run daily after the day's development records have been entered into the data set.

POST-TREATMENT BUDWORM DENSITY SAMPLING

Objective

The purpose of this sample is to evaluate the short-term success of the B.t. application in reducing populations of western spruce budworm to an acceptable level or below. Sampling will determine the post-treatment residual population levels for comparison against the target levels.

Population Reduction Standard

The short-term effectiveness of the insecticide treatment will be evaluated by how well it meets the objective of reducing budworm populations below a density of 1.0 healthy larvae and/or pupae per 45-cm branch tip within the treated areas.

Timing

Post-treatment density sampling will begin after most of the insecticide activity has ended. Sampling of each plot will be scheduled to occur at start of pupation following application of B.t. However, since periods of cool rainy weather may result in reduced larval feeding, slower development, and delayed mortality, timing of the post-treatment sample may vary.

Sampling Plan and Procedure

The post-treatment evaluation will utilize a multiple-stage sampling design with sample plots, trees within plots, and branches within trees as first, second, and third stage sampling units, respectively. A computer program (MUST for Multi-stage sampling (Hazard and Stewart, 1974)) will be used to evaluate sampling data from the 1983 and 1985 western spruce budworm suppression projects. This analysis will be used to provide estimates of budworm population variances between branches, trees, and plots, as well as their respective sampling costs, to calculate the optimum allocation of sampling effort to each of the multi-stage sampling units. The optimum allocation of sampling among sampling stages will be computed to minimize the sampling error for the cost expended to sample each stage. The results of the MUST analysis will provide a sampling design that will permit the estimation of post-treatment density mean over the AU at a level of precision of 30 percent (Sampling Error = +/-0.30) and with a 90 percent probability that the true mean will fall within the sampling error. The results of the optimum allocation statistics to establish the number and size of the evaluation plot sampling stages are included in Appendix D.

Evaluation plots will be distributed throughout the samplable host-type on the AU. Plots must be located at least 1/4 mile inside the spray block boundary to allow for the edge effect of spray application. A District Transportation map will be prepared showing all sample plot locations. In addition, an Evaluation Plot Location Data Sheet (blue copy of Biological Form No. 5, Appendix B) will be completed for each plot. Plots will be flagged with pink-glo and green-glo ribbon tied together, at the road and into the plot, and sample trees will be similarly identified with pink-glo and green-glo ribbon and a white tag containing the plot and tree number. It is important that accurate maps and directions to the plots are included on the Evaluation Plot Location Data Sheet so that plot trees can be revisited for followup sampling next year.

The sample trees in each plot will conform to the same criteria as stated for the Early Larval Density Sample: trees on each plot must represent a mix of budworm host types in the same proportion as that found in the surrounding stand; must contain current-year shoots (new shoots) in the mid-crown; must be reasonably open-grown and exposed to full sun most of the day; and must be 20 to 30 ft. tall so they can be sampled at mid-crown using a pole pruner. The sample trees on each plot will be located within a 1-acre area. Widely scattered open-grown host trees beneath a non-host overstory should not be selected as sample trees.

Branches 45-cm in length will be clipped from the mid-crown of each sample tree on the plot using a pole pruner equipped with a collecting basket. Each branch must have at least six new shoots. Care must be taken not to disturb branches other than the one being collected so as to avoid having larvae from these branches drop into the collecting basket. If other branches are accidentally disturbed, all budworm larvae must be removed from the basket and another sample branch clipped. Care must also be taken not to disturb the sample branch with the pole pruner until the collecting basket is situated below the branch. This will help insure that larvae which fall off the branch during the clipping procedure are collected in the basket. The care described in the foregoing must be exercised in taking this post-treatment evaluation sample to obtain reliable and unbiased estimates of the residual population density. Accuracy of these data is crucial since they provide the basis for conclusions regarding the efficacy of the B.t. treatment, and in part, the measurement of the success of the western spruce budworm suppression project.

Sample Processing

Processing of the Post-treatment evaluation sample will be done in the field at time of collection, or in the lab, at the option of the Project Entomologist. The following describes only the field procedure. After being clipped, each branch sample plus the contents of the collecting basket will be carefully deposited onto a white canvas drop cloth or cotton table cloth spread open on the ground near the sample trees. A visual inspection will be made of the basket to be sure all larvae have been dislodged. Field crew members must be alert to collect the larger larvae which attempt to escape to the edge of the drop cloth. Processing the sample in a shaded location should help to minimize larval activity. All larvae, pupae, and pupal exuviae (the case remaining after an adult has emerged) will be counted and collected for rearing (larvae and pupae) or examination (exuviae) by the Project Entomologist. Branch samples will be vigorously tapped with a stick to dislodge larvae while holding the branch over the drop cloth. The branch then will be carefully inspected for remaining larvae, pupae, or exuviae. Living larvae and pupae collected from either the branch or the drop cloth will be placed individually into plastic petri dishes and each dish labeled with the post-treatment interval collection date, spray block, plot, and tree number. Dead larvae will be collected and placed together in a petri dish, and the dish labeled as above.

In the same manner, pupal exuviae will be placed together in a petri dish with the dead larvae and labeled appropriately. All petri dishes from the sample should be placed together in a small paper sack for return to the lab, and the sack labeled with the post-treatment interval collection date, spray block, and plot number. Information from the plots will be recorded on goldenrod-colored Evaluation Plot Data Sheet (goldenrod copy of Biological Form No. 6, Appendix B). It is imperative to keep the sack containing budworm collections out of the

direct sun to avoid thermal death of the larvae or pupae in the dishes. Care should also be taken to avoid leaving samples in a vehicle parked in the sun, while another plot is being sampled. Samples should be placed in the styrofoam cooler for transport back to the laboratory. Blue Ice will be provided to help keep samples cool.

Laboratory Rearing of Post-Treatment Budworm Collections

For a number of reasons, not all budworm larvae will have died by the time the post-treatment evaluation is conducted at the beginning of pupation. However, some of these larvae (as well as pupae) may be infected with B.t. and, in time, will die. If such is the case, then measurement of post-treatment population density to compare against the Population Reduction Standard at these times, would be premature. Rearing larvae and pupae until either death or adult emergence occurs, would determine how many more individuals per branch will die if allowed sufficient time; thereby, more accurately reflecting treatment efficacy.

To rear the larvae, fresh artificial budworm diet will be provided to larvae in each dish. Media should be cut up and handled only with equipment that has been disinfected with Free-N-Clear, Econoquat, or other disinfectant (see Appendix E).

Larvae and pupae should be checked daily to determine the need to refeed larvae and detect mortality that may have occurred since the previous inspection was made. Larvae that die, and pupae which have not transformed into adults after 14 days in the pupal stage, will be collected and any remaining diet removed from the dish. After recording, the dead larvae and pupae are sent to Forest Pest Management in the Regional Office for further assessment. Results of rearing these field-collected budworm will be recorded on the yellow-colored Budworm Rearing Form (Biological Form No. 7, Appendix B).

ADP Entry and Report Generation

Post-treatment density data, rearing data, and plot location information will be entered from Biological Forms Nos. 6 and 7, into the Data General database file "LDENSITY," using FES. Data should be entered the same day as collected and sent to FCCC daily, to keep data files current. The folders used for the previous two databases apply here, as well: RIMROCK for the Rimrock Lake unit; J.D.NORTH for the unit North of John Day; and J.D.SOUTH for the unit South of John Day. Data from one project location should not be entered into the databases for either of the other two project locations.

The multiple record data file LDENSITY provides input to run the WESTBUDS system module that displays the post-treatment larval, pupal, and adult moth densities on a 45-cm branch basis. This information will provide the final measure of treatment efficacy for each project location. Details for accessing and running WESTBUDS to summarize the post-treatment densities are covered in Appendix C.

In addition, the module in WESTBUDS will run an analysis to determine latent mortality frequencies of surviving larvae and pupae that were collected and reared from the post-treatment budworm density sample. This analysis will be used to adjust the mean budworm density from the post-treatment sample with the proportion of observed latent mortality from B.t. A X^2 analysis will be done to determine whether the latent B.t. mortality is significant enough that estimating post-treatment density at the start of pupation results in

underestimating actual density. For this analysis, we assume that significant latent mortality does not occur beyond the onset of pupation that would require an adjustment of post-treatment evaluation means. The results of χ^2 analysis will enable us to make some statement about timing of post-treatment evaluation sampling of western spruce budworm population density in regard to the application of B.t.

POST-TREATMENT DEFOLIATION ESTIMATES

Objective

Post-treatment defoliation will be estimated to establish a baseline defoliation level with which to compare following years of defoliation against, as a measure of long-term effectiveness of B.t. treatment.

Timing

Post-treatment defoliation measurements will be taken at the same time as Post-treatment Budworm Density Sampling. In measuring post-treatment defoliation we are assuming that defoliation resulting from budworm feeding occurring after this date, will be negligible.

Sampling Plan and Procedure

Mid-crown branch samples collected from sample trees to determine budworm densities during the Post-Treatment Budworm Density Sampling, also, will be used to determine 1987 budworm defoliation. After the midcrown branch sample is clipped with pole pruner and basket, and larvae have been counted, the defoliation will be rated for a total of 20 new (current years') buds on each branch. A defoliation index based on the following will be used to rate current foliage for each branch sample:

<u>Defoliation Index</u>	<u>Percent Defoliation</u>
1	0
2	1-25
3	26-50
4	51-75
5	76-99
6	100

Defoliation data will be recorded on the green-colored Spruce Budworm Defoliation Sheet (green copy of Biological Form No. 8, Appendix B), in the appropriate place.

ADP Entry and Report Generation

Defoliation index data from the Evaluation Plot Data Sheet will be entered into the DG database file "DEFOLIATE," using FES. Data should be entered the same day as collected and sent to FCCC daily, to keep data files current. As before, the folder name will be either RIMROCK, J.D.NORTH, or J.D.SOUTH, depending on the project location. Data should be entered into only the database that is applicable to that location.

The dataset for "DEFOLIATE" will be used to run the program module "DEFOLIATE," in the WESTBUDS system at FCCC. This program will determine the average

defoliation for spray blocks and each AU, by using defoliation midpoints to compute a weighted mean. The 95 percent confidence intervals will also be computed by the program for each mean.

ADULT TRAPPING

Objective

Adult western spruce budworm trapping will be conducted during the 1987 suppression project to evaluate the residual post-treatment population on defoliation the following year, as a measure of long-term effectiveness of the B.t. treatment.

Timing

Pheromone traps will be placed in the field at about time of pupation at the same time as the post-treatment evaluation sampling is done, but prior to adult moth emergence and flight. This will probably be around the middle of July, but may vary depending on location and elevation.

Sampling Plan and Procedure

Adult sampling will be conducted using the western spruce budworm synthetic pheromone in sticky traps. Traps will be hung at the post-treatment evaluation plot site, with one trap per plot. Although not fully developed, this method makes use of the relationship between trap of adult males and defoliation the subsequent year. Details of the pheromone trap adult sampling plan and procedure had not been formalized by the time this plan was prepared, but will be covered in Appendix F to this plan.

After adult flight is over, or by the first week in September, all pheromone traps will be recovered from the field and counts made of the numbers of budworm moths found in each trap. The data will be recorded on the Budworm Pheromone Trapping Form (pink copy of Biological Form No. 9, Appendix B).

ADP Entry and Report Generation

Western spruce budworm moth trapping data from Biological Form No. 9 will be entered into the DG database file "MOTHS," using FES. Data should be entered as soon as it is collected and sent to FCCC the same day. The folder names will be the same as before, depending on the project location. Data should be entered into only the database that is applicable to that location.

The data set for "MOTHS" will be used to run the program module "MOTHS," in the WESTBUDS system at FCCC. This program will determine the average number of western spruce budworm moths trapped at each locality, as well as the average for each AU. The output table will also provide the predicted defoliation levels over each AU for 1988. The 95 percent confidence intervals will also be computed by the program for each mean.

SPRAY CARD ASSESSMENT

Objective

The purpose of the spray card assessment is to determine the overall quality of the spray application over each treated Analysis Unit. Analysis of spray deposit data will (1) determine if the treatment is reaching the intended target area; (2) determine if the treatment coverage was uniform over the treated area; and (3) determine whether the contractor met the minimum acceptable application density as specified in the contract (20 drops/cm² on randomly placed droplet deposit sampler lines). Deposit assessment data will be used to provide timely information to Application Team Leaders and/or Aerial Observers for making on site corrections of application deficiencies.

Timing

Spray deposit cards will be put out in predetermined locations just prior to spraying blocks each treatment day. This will require crews to be at the deposit sampling plots in plenty of time to place deposit samplers (spray deposit cards) in the sampling sites before the aerial application commences for that day. Typically, card crews will be on deposit sampling plots well before daylight, since treatment of the spray blocks may begin 1/2 hour before sunrise. Cards should not be placed in the field overnight, however, because dew can cause the cards to warp which might result in a non-representative sample of deposit, and make drop counting more difficult.

Sampling Plan and Procedure

An attempt will be made to obtain spray deposit information from every treated block on an AU. Since remoteness or roadlessness of some blocks, or portions of certain blocks, may prevent or limit access to treatment areas, it may not be possible to sample all areas.

The sampling design will make use of a card line all the way across a spray block or an equilateral triangle sampling grid, similar to that used for characterizing aircraft spray (Dumbauld and Rafferty, 1977). If a triangular sampling grid cannot be established because of space limitations, a meandering line will suffice. Spray deposit will be assessed on each spray block by a minimum of two triangular spray sampling grids or card lines across blocks, randomly placed in openings suitable for sampling. Additional deposit sampling grids or card lines can be put out if time permits. Each leg of the triangular sampling grid will be 450 ft long, and will contain 15 deposit samplers spaced at 30-ft intervals on each of the 3 legs of the triangle. The triangular sampling grid geometry is designed to minimize the angle between the flight path of the aircraft and the sampling line, since it may not be known before hand, the direction in which the flight will occur. Card lines which cut across a spray block may be used when the direction of flight is known. In these cases, more than 45 cards may be used. Also it may be desirable to increase the distance between samplers to perhaps 50 feet or more.

Sampling site selection should be done ahead of time so that crews may become familiar with the terrain where samplers will be located. Potential hazards along the route to the sampling site should be removed or marked well enough so that they can be recognized and avoided by card assessment crews that must enter the sites in the dark, early morning hours to put out spray deposit samplers. The sampling sites should be relatively large open areas, which are free of

between the loops of the special wire stakes which were placed in the field the previous day.

The location of sampling grids or cardlines should be known to only Spray Assessment personnel. Deposit sampler locations will be drawn on the back of each Spray Deposit Assessment Form (white copy of Biological Form No. 10, Appendix B). The maps will be easy to read, large enough scale to include sufficient detail that any project personnel can return to the site. Spray sampling grid or cardline maps should include obvious land marks, North direction, road or trail to cardline or grid, and any other helpful information.

Placement of card grids or lines is critical to the collection of useful and accurate spray deposit information. Large openings should be utilized where available since these situations offer the best opportunity to assess spray deposit with minimal interference from trees, buildings, or other objects which might alter or obstruct the spray pattern. Meandering lines through a stand or across a spray block presents greater difficulties in establishing sampling points in relatively open areas, but has the benefit of being less obvious to the spray ship or observer from the air. Cardlines located within a stand should preferably not contain samplers located any closer than a distance of at least one tree height to the nearest tree to prevent deposit losses from the filtering or screening influences of the trees. In addition to card grids or cardlines, spray deposit cards should be located out from the dripline 10 feet, in each of the 4 cardinal directions (N, E, S, and W) of the post-treatment evaluation plot trees, to establish a record of treatment that can later be used to help explain anomalies in post-treatment budworm densities.

During treatment of a spray block, Spray Assessment personnel should quickly examine all spray cards within a few minutes after spraying. Crews should report appearance of spray deposit on cards, and any obvious skips, to the aerial observer via radio so that corrections can be applied. Crews will wait a minimum of 1/2 hour before collecting cards from a treated area to allow time for the fine droplets to settle out. Cards will be collected and handled in such a manner as to not disturb the deposit-bearing surface. Each card will be collected in numerical sequence, and a field estimate made of the number of droplets (including fines) within the one square-centimeter box drawn on the card. The number of droplets will be recorded on the Spray Deposit Assessment Form. After estimating deposit, cards will be carefully removed from the plastic holder and inserted into a separate slot in the wooden slotted card box, keeping cards in their proper numeric order. Cards can be placed back-to-back, two cards per slot if more space is required, in the card box. Card boxes should be covered to insure dust or moisture does not reach the cards while being transported for further examination.

Laboratory Procedure

Counts of deposit will be conducted on a random sampling of cards drawn from each cardline or spray sampling grid. The Spray Assessment Group Leader will assign which cards to count based on a draw of card numbers from a random number table. A total of 20-percent of the cards from each sampling grid or cardline will be drawn in the sub-sample for counting. The deposit within the one-centimeter square of each card drawn will be counted (including fines) using a handheld magnifier or under a microscope. The number of droplets counted will be entered on the Spray Deposit Assessment Form in the appropriate place. Zero should be used for cards with no apparent deposit. The Spray Assessment Group Leader will randomly check the counts on some of the counted cards, using a

dissecting microscope. Recounts of cards will be made if the crew member's counts differ by more than +/-20-percent of the Spray Assessment Group Leader.

ADP Entry and Report Generation

Spray deposit data from the Spray Deposit Assessment Form will be entered into the database file "DEPOSIT," or "EDEPOSIT" on the DG using FES. Data should be entered as soon as it is collected and sent to FCCC the same day. The folder name, as before, will depend on the project location. Data should be entered into only the database that is applicable to that location.

The dataset for "DEPOSIT" will be used to run a program module in the WESTBUDS system at FCCC. This program will use statistical procedures for double sampling data to compute a linear regression equation that provides an estimate of the average droplet density on the block, based on the regression of the counted droplets with the estimated droplets. A correlation coefficient is also computed and can be used to evaluate how accurately counts are being estimated. The program will also produce a report summarizing the day's spraying of all blocks that day, a summary of the average density over the entire AU to date (average of all blocks treated to date), and a summary by spray aircraft tail number for the date and for the project. The Spray Assessment Group Leader will plot results on graphs and post information where Application Team members and Operations Chief and others can view daily application progress.

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APPENDIX A

OPTIMUM ALLOCATION FOR EARLY LARVAL DENSITY SAMPLING PLOTS

Multi-stage Costs Used:

First Stage (Plots)	11.6
Second Stage (Trees)	4.6
Third Stage (Branches)	0.0

Allocation of Samples at 15 Percent Sampling Error (S.E.) and 95 Percent Probability (P=0.95):

First Stage	40 Plots
Second Stage	3 Trees
Third Stage	1 Branch

APPENDIX B

FORMS

BIOL. FORM #1

FIELD DATA COLLECTION SLIP

AU NAME _____

BLOCK No. _____

PLOT No. _____

TYPE SURVEY _____
(dens, devel, eval, egg mass)

ELEVATION _____ feet

COLLECTORS _____

DATE COLLECTED _____

TREE No. _____

BRANCH No. _____

BIOL. FORM #1

FIELD DATA COLLECTION SLIP

AU NAME _____

BLOCK No. _____

PLOT No. _____

TYPE SURVEY _____
(den, devel, eval, egg mass)

ELEVATION _____ feet

COLLECTORS _____

DATE COLLECTED _____

TREE No. _____

BRANCH No. _____

BIOL. FORM #1

FIELD DATA COLLECTION SLIP

AU NAME _____

BLOCK No. _____

PLOT No. _____

TYPE SURVEY _____
(dens, devel, eval, egg mass)

ELEVATION _____ feet

COLLECTORS _____

DATE COLLECTED _____

TREE No. _____

BRANCH No. _____

BIOL. FORM #1

FIELD DATA COLLECTION SLIP

AU NAME _____

BLOCK No. _____

PLOT No. _____

TYPE SURVEY _____
(dens, devel, eval, egg mass)

ELEVATION _____ feet

COLLECTORS _____

DATE COLLECTED _____

TREE No. _____

BRANCH No. _____

** WESTERN SPRUCE BUDWORM PROJECT -- 1987 **

EARLY LARVAL DENSITY DATA ENTRY SHEET

FOREST CODE ___ AU NUMBER ___ DATE SAMPLED ___/___/87

BLOCK NUMBER ___ PLOT NUMBER ___ TREE SPP. (DF,TF) ___

TREE NUMBER	---NO.--- BRANCHES	---NO. BUDWORM--- LARVAE	PUPAE	---NO. BUDS--- CLOSED	OPEN
1	1	___	___	___	___
2	1	___	___	___	___
3	1	___	___	___	___

COMMENT: _____

TREATMENT BLOCK RELEASE FORM

DATE _____

ANALYSIS UNIT NAME _____

SPRAY BLOCK No.	DATE RELEASED	DATE TO BE TREATED BY (48 hrs)	-----PERCENT-----	
			5th INSTAR	BUDBURST
-----	-----	-----	-----	-----
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

RELEASED BY _____

TITLE _____

** WESTERN SPRUCE BUDWORM PROJECT -- 1987 **

BUDWORM DEVELOPMENT PLOT DATA SHEET

FOREST CODE AU NUMBER DATE SAMPLED / / 87

BLOCK NUMBER PLOT NUMBER TREE SPP. (DF,TF)

TREE	TOTAL BUDS	BUDS CLOSED	SBW INSTARS					SBW PUPAE	OTHER LARVAE
			2nd	3rd	4th	5th	6th		
1	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
2	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

COMMENTS: _____

WESTERN SPRUCE BUDWORM
EVALUATION PLOT LOCATION DATA SHEET

INSTALLATION CREW _____

BLOCK NUMBER _____

DATE INSTALLED _____

AU NUMBER _____

ANALYSIS UNIT NAME _____

PLOT NUMBER _____

SLOPE _____ ASPECT _____

ELEVATION _____ ft

TAG & FLAG AT ROADSIDE _____

TOWNSHIP _____ S

TAG & FLAG ON PLOT TREES _____

RANGE _____ E

SAMPLE TREE SPECIES _____

SECTION _____

PERCENT PINE OVERSTORY _____

1/4 SECTION _____

PERCENT HOST OVERSTORY _____

ACCESS ROAD(s) TO PLOT _____

PLOT DESCRIPTION _____

DIRECTIONS TO PLOT _____

MAP TO PLOT

** WESTERN SPRUCE BUDWORM PROJECT -- 1987 **

EVALUATION PLOT DATA SHEET

FOREST CODE ___ AU NUMBER ___ DATE SAMPLED ___/___/87

BLOCK NUMBER ___ PLOT NUMBER ___ TREE SPP. (DF,TF) ___

TREE NUMBER	BRANCH NUMBER	BUDWORM			OTHER LARVAE	NUMBER BUDS
		LARVAE	PUPAE	EXUVIAE		
1	1	___	___	___	___	___
	2	___	___	___	___	___
2	1	___	___	___	___	___
	2	___	___	___	___	___
3	1	___	___	___	___	___
	2	___	___	___	___	___

COMMENTS: _____

** WESTERN SPRUCE BUDWORM PROJECT - 1987 **

SPRUCE BUDWORM DEFOLIATION SHEET

FOREST CODE ___ AU NUMBER ___ PLOT NUMBER ___ DATE SAMPLED ___/___/87

TREE NUMBER	BRANCH NUMBER	BUD/SHOOT DEFOLIATION ESTIMATE																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1	1	-	-	-	-	-		-	-	-	-	-		-	-	-	-		-	-	-	-
	2	-	-	-	-	-		-	-	-	-	-		-	-	-	-		-	-	-	-
2	1	-	-	-	-	-		-	-	-	-	-		-	-	-	-		-	-	-	-
	2	-	-	-	-	-		-	-	-	-	-		-	-	-	-		-	-	-	-
3	1	-	-	-	-	-		-	-	-	-	-		-	-	-	-		-	-	-	-
	2	-	-	-	-	-		-	-	-	-	-		-	-	-	-		-	-	-	-

R6FPM (5/87)

(Database = DEFOLIATE)

COMMENTS: _____

DEFOLIATION INDEX KEY:

- 1 - 0%
- 2 - 1-25%
- 3 - 26-50%
- 4 - 51-75%
- 5 - 76-99%
- 6 - 100%
- 9 - MISSING VALUE

** WESTERN SPRUCE BUDWORM PROJECT - 1987 **

SPRAY DEPOSIT ASSESSMENT FORM FOR EVALUATION PLOT

FOREST CODE _____ AU NUMBER _____ DATE SAMPLED ___/___/87

BLOCK NUMBER _____ PLOT NUMBER _____ CARD PATTERN 3

TREE NUMBER	CARD. DIRECT.	COUNT DEPOSIT	TREE NUMBER	CARD. DIRECT.	COUNT DEPOSIT	TREE NUMBER	CARD. DIRECT.	COUNT DEPOSIT
1	N	___	2	N	___	3	N	___
	E	___		E	___		E	___
	S	___		S	___		S	___
	W	___		W	___		W	___

R6FPM(5/87)

(Database - EDEPOSIT)

COMMENTS: _____

APPENDIX C

COMPUTER PLAN NOT AVAILABLE AT THIS TIME. IT WILL BE DISTRIBUTED LATER.

APPENDIX D

OPTIMUM ALLOCATION FOR POST-TREATMENT BUDWORM DENSITY SAMPLING PLOTS

Multi-stage Costs Used:

First Stage (Plots)	11.6
Second Stage (Trees)	1.4
Third Stage (Branches)	3.2

Allocation of Samples at 30 Percent Sampling Error (S.E.) and 90 Percent Probability (P=0.90):

First Stage	40 Plots
Second Stage	3 Trees
Third Stage	2 Branches

APPENDIX E

FREE-N-CLEAR CONCENTRATED DISINFECTANT

(Quaternary Ammonium Chloride Germicidal Compound)

Instructions for making a solution at the use rate of 1/2 oz per gallon (0.4% solution):

1. Add 15 ml of Free-N-Clear concentrate to a gallon jug.
2. Fill jug to top with water (distilled water if available).
3. Label jug appropriately.

APPENDIX F

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER V

PLANS AND INTELLIGENCE

CHAPTER V

PLANS AND INTELLIGENCE UNIT

(Maps and Records)

I. UNIT OBJECTIVES

- A. To provide adequate maps and aerial photographs for the project.
- B. To coordinate and produce the Project Operations Plan.
- C. To gather and map intelligence information.
- D. To produce daily spray plans.
- E. To coordinate entomological information.
- F. to provide meteorological information.
- G. To keep accomplishment records and maps to determine current project status.
- H. To monitor application performance via Pathlink analysis.
- I. To provide modeling based on current environmental application conditions.

II. ORGANIZATION PERSONNEL

- A. The Plans and Intelligence unit will report to the Project Director and shall consist of the following personnel structure shown in Illustration 1.
- B. Position descriptions for all Plans and Intelligence jobs are located in Chapter IV.

III. PLANS AND INTELLIGENCE RESPONSIBILITIES

A. Pre-Spray

1. The Plans and Intelligence unit will procure the necessary aerial photos and maps to assist the Operations unit with the on-the-ground planning of heliport locations and spray block boundaries. Intelligence data will also be gathered by the Plans and Intelligence unit from the on-the-ground planning team and from outside sources.
2. On-the-ground plans developed by cooperative effort of Plans and Entomological teams shall be transferred by the Plans and Intelligence unit to base maps used to prepare daily spray plans. Base maps for the project will include:

- a. Public Information Map with a scale of 1" = 1 mile. Project and block boundaries as well as roads and stream locations will be the basic information shown.
 - b. Dispatch Map with a scale of 1" = 1 mile that shows project and block boundaries, weather station location. Current crew and equipment locations will be maintained on this map by the dispatcher.
 - c. General Transportation Map with a scale of 1" = 1 mile. showing project boundaries, heliport location (with identification).
 - d. Detailed Hazard Map with a scale of 1" = 1 mile. In addition to the General Transportation Map information, this map will contain specific instructions pertinent to the access location of heliports and hazards unique to a specific spray block.
 - e. Progress Map with a scale of 2.64" = 1 mile. Project block boundaries and heliport locations will be displayed. This map will be used by Plans and Intelligence for data compilation, spray operation updates, and provide a means for usually reviewing the current project status.
 - f. Aerial Operations Maps. There are two types available for use and pilot preference will prevail. The first is a film positive 1.3 enlargement of a 1:12,000 aerial photo with project and block boundaries, heliport location, and any pertinent hazard information associated with the spray area. The second type is also a film positive Planametric Quad 7 1/2' with a 1:24,000 scale with topographic intervals of 40' and 80'.
3. Spray plans developed for individual blocks containing sensitive or unique characteristics shall be coordinated by the Plans and Intelligence unit into the overall daily spray plan for the project.
 4. The Plans and Intelligence unit will procure a Project Meteorologist and make arrangements for gathering necessary weather data from the National Weather Service, portable remote weather stations, individual party participation in remote portions of the spray area, and by personal collection at headquarters to facilitate the most accurate forecast.
 5. The Plans and Intelligence unit will procure a computer system with word processing capability and with sufficient data base for compiling all individual record entries for the spray project. A second system will provide Pathlink analysis and modeling of spray results.

B. DURING SPRAY OPERATIONS

1. The Plans and Intelligence unit will provide the necessary support for the Project Meteorologist and incorporate all meteorological

information into the Daily Spray Plan. In addition, actual weather data collected onsite will be maintained for the records.

2. Maintain liaison with Air Operations Managers for prompt receipt of all daily accomplishment data. All data entries will be completed daily and daily summaries computed.
3. A Plans and Intelligence unit representative will be available to participate in daily planning team meetings and a record of daily spray plans will be maintained.
4. Entomological information obtained from the Project Entomologist will be incorporated into daily team planning sessions and daily spray plans to determine spray priorities.
5. Updating of maps will be provided as necessary.
6. Maintain and analyze Pathlink data.

C. POST SPRAY

1. Debrief all unit personnel and ensure that the performance of all unit personnel is reviewed and recorded.
2. Compile permanent project records and maps.
3. Ensure that all borrowed and rented equipment is returned and that all agreements for services are in proper order. Included are:
 - a. Inventory computer hardware and office machinery and return to vendor(s).
 - b. Ensure all persons hired for weather observation and other temporary duties have been compensated.
 - c. Other items as developed in the project and unit Demobilization Plan.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER VI

ADMINISTRATION

CHAPTER VI
ADMINISTRATION

I. ORGANIZATION/PERSONNEL

The Administration Unit will report to the Project Director and shall consist of the structure shown on the organization chart.

Position descriptions for all Administration jobs are located in Chapter III.

II. PROJECT HEADQUARTERS

Project headquarters are located downtown in John Day, Oregon and will be rented by the Malheur National Forest for the duration of the project.

Offices necessary for project implementation and administration will be located in the same building.

III. FINANCIAL ACCOUNTABILITY

A. Purchasing

Purchasing authority for all project needs is contained within the Administration Unit. All requests for purchases will be made via requisition and will require prior approval by either the Supply/Services Chief or the Administrative Officer.

Handling of all requisitions for materials and services will be through standard Forest Service and GSA purchasing regulations. Standard avenues for procurement will include:

1. Excess Property
2. Federal Prison Industries
3. GSA
4. Federal Supply Schedule Contracts
5. Optional Federal Supply Schedule Contracts
6. Redmond Air Center
7. Boise Interagency Fire Center (BIFC)
8. Local Purchase and Open Market

All requisitions will be routed through the appropriate Operations Manager for submission to Administration.

B. Financial Plan

The purpose of this plan is to advise all participating employees and Forests as to how the finances of the project will be managed, as well as who and how a variety of documents are to be processed. This plan will provide sufficient information so that financial management will receive uniform application by all parties.

Objective - To manage the finances of the project in such a manner that minimizes the impact on all participating units and insure that all charges are applied direct to the Spray Forest or transferred to the Spray Forests at the earliest opportunity.

C. General

All participants must be aware that there are two distinct and separate projects, Wenatchee and Malheur. Participants must insure that any and all charges they make must be to the benefitting project.

The Spray Forests will establish a separate 'Sub Unit' through NFC against which all expenditures will be applied.

The number of Management Codes will be kept to an absolute minimum. At the current time all expenditures are to be charged to:

1. Malheur Project - M/C 247915
2. Wenatchee Project - M/C 311715

Additional Management Codes will be set up if/when needed.

Each Spray Forest will issue Authorizations for In-Service Expenditures, Forms 6500-46, to all participating Forest Service Units who have employees assigned to the spray project. Participating units will be requested to provide the Spray Forests with actual expenditures and unpaid obligations periodically during the life of the projects. Expenditures will be transferred to the Spray Forest immediately after completion of the project.

When establishing your reimbursable accounts for the above 6500-46, insure that you include the following project numbers in the first 6 digits of the project field on your AD-729:

1. Malheur Project - 247915
2. Wenatchee Project - 311715

If these project numbers conflict with numbers now in use by your forest, please advise the Spray Forest(s).

Any charges to either project other than salary, travel, equipment use, must be approved by the appropriate Project Manager or Administrative Officer. This will include, but not be limited to, Purchases, (838's, imprest, AD-744), Contracts, etc. For purposes of this plan, financial management procedures will be broken into two separate phases, 1) Actual Spray Procedures, and 2) Pre/Post Spray Procedures.

D. Actual Spray Procedures - Includes the period when participants are assigned full time to the project.

1. Salaries

Full pay periods will be processed by the Spray Units using the T/A Override process. Partial pay periods will be processed by the home unit and applied to the 6500-46's.

For participants assigned 'full time' to the project, it will be necessary for the home unit to "move" the electronic payroll information to the Spray Forests at the beginning of the first full pay period of their detail. The Spray Forests will then process these T/A's using the override process. Electronic T/A information will be moved back to the home forests upon completion of "full time" portion of detail.

As there is no override procedure for partial pay periods, the home forests will process the T/A's, applying the charges to the 6500-46's.

2. Travel Vouchers

Travel Vouchers will be processed by the Spray Units using the override process. To avoid the possibility of overpayments, participants are to furnish the Spray Administrative Officers with a copy of their last voucher. Copies of all vouchers will be provided to the home forests. Vouchers will be approved by the Project Manager or Administrative Officer.

3. Equipment Use

The Spray Administrative Officers will furnish the home forests with the ending mileage of each vehicle and the number of miles chargeable to the spray project at the end of each month for those vehicles still on the project. Home forests will process all equipment use utilizing their normal procedures, charging all spray project use (see above M/C's) using the override process.

4. Contract Rentals and GSA Vehicles

Home forests will be notified of the ending mileage and use to be charged to the project at the end of each month. Home Forests to process payments through the normal process. Usage applicable to the Spray Project will be applied to the 6500-46.

5. Other Expenditures

During this period there should be little, if any, purchases or other expenditures on other units. Purchases must be approved by the Project Manager or Administrative Officer prior to purchase. Those that are authorized are to be applied to the above 6500-46's.

E. Pre/Post Spray Procedures

1. Pre-Spray includes expenditures for meetings and other work properly chargeable to the project up to the time the employee is assigned full time to the project. Post-Spray include expenses for those participants involved in writing reports or other activities after ending their full time participation in the project.

- a. Salaries of participants to be processed by the home forest and applied to the above 6500-46.

- b. Travel Vouchers will be prepared by the home forest and charged to the appropriate M/C's shown above using the override process. Vouchers can be approved by the home forest. Copies of all vouchers will be forwarded to the Project Administrative Officer.
- c. Equipment Use to be processed by the home forest and charged the appropriate M/C shown above using the override process.
- d. Other expenditures, i.e. purchases, rental vehicles, etc., should be processed using available override processes where appropriate. Where inappropriate, apply such expenditures to the above 6500-46's.

IV. PERSONNEL WELFARE

A. Forest Service Employees

1. Time and Attendance

Complete Weekly Time Report and submit to Administration at end-of-shift each Saturday. After approval, the Weekly Time Reports will be posted to T&A's and electronically submitted to NFC for processing.

A blanket overtime authorization will be approved for all Forest Service employees detailed to the project.

Tour of duty while at the project will be first 40-hour with tour beginning Monday morning. Sunday is designated "day off." Any work on Sunday will be paid as overtime; there will be no Sunday or Sunday night differential.

Forest Service employees are eligible for hazard pay for flight time under 500 feet.

2. Meals and Lodging

All employees are responsible for making arrangements for living accommodations while in John Day.

Standard per diem rules are in effect for Forest Service employees.

Local employees may be eligible for per diem if they are gone over 10 hours and purchase a commercial meal - or if they leave their residence before 6:00 AM or return after 8:00 P.M.

Everyone is guaranteed 40 hours per week.

Time starts at the time employee leaves motel/residence and stops on return.

3. Vehicles

Vehicles will be provided through GSA, by acquiring WCF fleet vehicles for the duration of the project, and/or by detailers providing their own WCF vehicle. Key lock facilities will be provided on a 24-hour basis for fueling vehicles.

V. COMMUNICATIONS

- A. Telephone communications will be provided at project headquarters along with a Data General computer system. Radio links will be available for operations management.

VI. . DISPATCH SERVICES

- A. Dispatchers will be on duty at all times during operations and will maintain the following information: Status records of all personnel by location. The dispatch person will be on duty until all personnel have reported.

The dispatcher will maintain current daily accomplishments of the project.

The dispatcher will maintain personal data cards for all personnel working on the project.

STATE FORESTRY PERSONNEL EXPENSE ACCOUNT RULES

Generally, Commercial In-State travel rules will apply to all OPEU, AEE, and Management Service personnel. Each person will be responsible to provide their own meals and lodging during the time they are assigned to the project.

The following points need to be considered before submitting an Expense/Per Diem Statement:

1. If a person is temporarily released from the project and/or returns to their home, their travel status changes and must be reflected on the Claim Form.
2. A few meals will be paid by Purchase Order during the training program that precedes the beginning of application - these meals must be identified on the Claim Form.
3. All Expense/Per Diem Statements MUST be included by your immediate supervisor and approved by Services Support Director (Jim Coyle).
4. If one Claim Form is ended and another started without a change in travel status, the beginning time on the second claim must be the same as the ending time on the first claim.
5. Expense checks will be mailed to the "Official Station" noted in Block 5 of the Claim Form, unless additional instructions are also noted in the same location.

6. If a Request For Advance of Travel Expense has been received, the full amount of the advance payment must be documented on a confirming Expense/Per Diem Statement before any additional advance of travel expense may be requested.

Management Service

1. An allowance of \$48.00 less lodging (\$27.50) and any meals (\$4.50, \$5.00, & \$11.00) paid on Purchase Order for each FULL 24 hour period beginning with time of departure from Official Station.
2. The last day of travel, if return time is:
 - a. Before the end of 24 hour period - subtract \$1.00 per hour for difference.
 - b. After the end of 24 hour period - add \$1.00 per hour for difference.
3. * Time of departure and return will be rounded to the nearest FULL hour.

OPEU

1. Meal allowance of \$4.00 for breakfast, \$4.50 for lunch, and \$10.00 for dinner will be provided for each day in overnight travel status.
2. On the initial day of travel, allowances will be paid if departure time meets the following:

BREAKFAST - 2 hours before the middle of the SCHEDULED shift EXCLUSIVE OF EATING TIME.

LUNCH - 2 hours before the middle of the SCHEDULED shift.

DINNER - Before the end of SCHEDULED shift.
3. On the last day of travel (day of return) allowances will be paid if return time meets the following:

BREAKFAST - Start of SCHEDULED shift.

LUNCH - 2 hours past the middle of the SCHEDULED shift.

DINNER - 2 hours past end of SCHEDULED shift EXCLUSIVE OF EATING TIME.

The attached samples will provide some examples of how some of the items mentioned above may be completed. These forms may be completed in pencil.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER VII

LIAISON PLAN

CHAPTER VII

LIAISON PLAN

MALHEUR NATIONAL FOREST

This plan is developed for coordination and liaison with and between cooperators, that could be affected or involved in the Malheur National Forest 1987 Western Spruce Budworm treatment project. It is intended to provide a functional system by which the project management team can have easy access to a high degree of technical information as well as to facilitate contracting participating agencies.

The plan relies on relevant communication, coordination and cooperation between all parties involved in the treatment project.

This document is to provide a directory of agencies and individuals who will be appraised of the activities of the project and to list their areas of expertise in the event their services are deemed necessary. This directory should be accessible to all personnel associated with the project and it will be their responsibility to become familiar with its content.

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1987 WESTERN SPRUCE BUDWORM COORDINATING DIRECTORY

MAY 12, 1987

1. OREGON ACCIDENT RESPONSE SYSTEM (OARS) 1-800-452-0311
Immediate contact on all spills
Advice and procedures

2. DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ) 276-4063
Eastern Region
Steve Gardels
700 SE Emigrant
Pendleton, OR 97801

Member of OARS
Technical Assistance
Contamination Prevention Planning

HAZARDOUS WASTE DISPOSAL
Rich Reiter 229-6434

Communication center will selectively notify OARS members

3. EMERGENCY MANAGEMENT DIVISION 378-4124
Archie Mustard, Operations Officer
Alva Jones
43 Capitol Bldg.
Salem, OR 97310

4. GRANT COUNTY SHERIFF'S DEPARTMENT 575-1131
Rob Walker, Sheriff (notify Lorene Allen if emergency)
Canyon City Courthouse
Canyon City, OR 97820

HARNEY COUNTY SHERIFF'S DEPARTMENT 573-6156
Dave Glerup, Sheriff
Burns, OR 97720

Help with Civil Disturbance
Help with disasters - crashes, vehicle accidents, spills
Help with traffic control
Assistance may be limited by availability of resources - will depend
on severity of need

5. STATE POLICE
125 Ford Road
575-0471 if no answer 1-800-452-6516

Assistance provided would be similar to that provided by Grant and
Harney Sheriffs
Assistance will be limited as with Sheriff's also

6. FAA FLIGHT STANDARDS DISTRICT OFFICE #64

Joe Redwine 688-9720
3355 NE Cornell Rd 221-2104
Hillsboro, OR 97124

Help with air quality questions and/or monitoring

7. GRANT AND HARNEY COUNTIES EXTENSION SERVICE

Peter Teft 575-1911
Canyon City Courthouse
Canyon City, OR 97820

Dave Chamberlin 573-2506
Burns, OR 97720

Small woodland owner concerns

8. US ENVIRONMENTAL PROTECTION AGENCY

Anitia Frankel, Branch Chief
Mailstop 524
1206th Ave.
Seattle, WA 98101

Petroleum Spills

Mike Gearheard 221-3250
522 SW 5th
Portland, OR 97201

Restricting public use areas adjacent reservoirs

9. WORKERS COMPENSATION DEPARTMENT, ACCIDENT PREVENTION DIVISION

Loy Knuzen, Assistant Manager 686-7562 686-7504
2677 Willakenzie, Suite 6
Eugene, OR 97401

10. OREGON STATE HEALTH DIVISION

Dr. Larry Foster, 229-5792
Mike Heumann
1400 SW 5th
Portland, OR 97201

Determines potential for impacts of public health
Public information

11. DEPARTMENT OF FISH AND WILDLIFE

Ron Garner (Local Biologist) 573-6582
Burns, OR 97720

Greg Hattan 575-1167
305 N Canyon City Blvd.
Canyon City, OR 97820

Irv Jones 229-5683
P.O. Box 3503
Portland, OR 97208

Help with identifying critical fish and wildlife habitat
Member of OARS
Environmental monitoring

12. DEPARTMENT OF TRANSPORTATION-PARKS AND RECREATION DIVISION

John Day, OR 97845 575-2773

Control public access in recreation sites

13. BUREAU OF LAND MANAGEMENT

Joshua Warburton 573-5241
Burns, OR 97720

Access and use of BLM lands
Slash disposal/smoke management planning
Help with ownership concerns
Additional manpower and/or resources

14. C. P. NATIONAL

575-0161

Alva Conlee, District Manager
245 S. Canyon Blvd.
John Day, OR 97845

15. *BONNEVILLE POWER ADMINISTRATION-DISPATCHER

Lower Columbia Area Transmission Maintenance
P.O. Box 3621 - O.P.T. 283-2511
Portland, OR 97208

Transmission Lines
Provide information on safety concerns

*Must notify dispatcher if spray aircraft is over or near power lines

16. DEPARTMENT OF FORESTRY-FOREST PRACTICE SECTION

Leo Wilson, Director 378-2494
Charlie Stone 378-5061
2600 State St.
Salem, OR 97310

17. FEDERAL AVIATION ADMINISTRATION AND STATE DIVISION OF AERONAUTICS

REDMOND 1-503-523-2961

BAKER 1-503-548-2522

Closed Air Space:

Upon receipt of order from the project coordinator, the dispatcher will initiate temporary flight restrictions in the vicinity of the project.

1. Area covered: Airspace below 2000' AGL and normally within 5 miles of the site; however, order to FAA requires exact dimensions (by coordinates and/or mileage from geographical areas, and/or legal).
2. Applies to all nonessential aircraft, including low level military training flights.
3. Order is placed with Seattle Flight Service Station (on their 24-hour number 206-931-5222 or 206-833-6800) in addition, the military must be advised of action taken.
4. Strive for release of the closed air space at the earliest practical time when the emergency need has lessened.

Military training routes - low altitude, high speed flights (VFR) (IR 346)

Low altitude, high speed VFR operations are those conducted at or below 1,500 feet above ground level. Flights originate from NAS Whidbey Island, daily on weekdays and periodically on weekends.

Daily Notice of Operations - Call (503) 648-1022

Closed Air Space Coordination:

Northwest Mountain Region
17900 Pacific Highway, South
Seattle, WA 98168

ATTN: A.N.M.-534 (Bob Brown) (206) 431-2534

In case of project air traffic that will interfere with this military route, dispatchers will notify:

Commander John Shork 9-1-(206)257-2870
COMMATVAQWINGPAC - Code 35
Whidby Island Naval Air Station
Oak Harbor, WA 98278

Route for; VR-319, VR-1301, VR-1352, IR-1301, IR-304

Enters project area from the west in vicinity of Oywhoe Reservoir, goes west through Silvies Valley area.

Route width: 4-6 nautical miles either side of centerline.

Air speed: Subsonic about 250 knots indicated air speed.

Altitude: At or below 1,500 feet above ground level.

GRANT/HARNEY COUNTIES DIRECTORY

1. MALHEUR NATIONAL FOREST 575-1731
Kenneth L. Evans, Supervisor
139 NE Dayton
John Day, OR 97845
2. BEAR VALLEY RANGER DISTRICT 575-2110
Donald Hanson, District Ranger
528 East Main
John Day, OR 97845
3. BURNS RANGER DISTRICT 573-7292
Harold Beamer, District Ranger
Star Route 4-12870 Highway 20
Hines, OR 97738
4. LONG CREEK RANGER DISTRICT 575-2110
John L. Shoberg, District Ranger
528 East Main
John Day, OR 97845
5. PRAIRIE CITY RANGER DISTRICT 820-3311
Bud Sloan, District Ranger
327 Southwest Front
Prairie City, OR 97869
6. OREGON DEPARTMENT OF FISH AND WILDLIFE
Ron Garner 573-6582
Burns, OR 97720

Greg Hattan 575-1167
305 N. Canyon City Blvd.
Canyon City, OR 97820
7. OREGON STATE POLICE
Sgt. Ralph Nelson
125 Ford Road
575-0471 if no answer 1-800-452-6516
John Day, OR 97845
8. JOHN DAY VOLUNTEER FIRE DEPARTMENT
Tom Sutton, Chief
414 SW Brent
John Day, OR 97845

Dispatch Center 575-0030
242 S Canyon Blvd. 575-1855
John Day, OR 97845

9. GRANT/HARNEY COUNTIES EXTENSION SERVICE
Peter Teft 575-2506
Canyon City Courthouse
Canyon City, OR 97820

Dave Chamberlin 573-2506
Burns, OR 97720
10. C. P. NATIONAL 575-0161
Alva Conlee, District Manager
245 S Canyon Blvd.
John Day, OR 97845
11. GRANT COUNTY SHERIFF'S DEPARTMENT 575-1131
Rob Walker, Sheriff
Canyon City Courthouse
Canyon City, OR 97820
12. HARNEY COUNTY SHERIFF'S DEPARTMENT 573-6156
Dave Glerup, Sheriff
Burns, OR 97720
13. JOHN DAY POLICE DEPARTMENT 575-0030
William Gibson, Chief
240 S Canyon Blvd
John Day, OR 97845
14. PUBLIC SAFETY 575-1731
US Forest Service
Donald G. Jordan, Special Agent
139 NE Dayton
John Day, OR 97845
15. GRANT COUNTY PUBLIC HEALTH DEPARTMENT 575-0429
Claudia Evans, County Health Nurse
200 S Humbolt
Canyon City, OR 97820
16. BUREAU OF LAND MANAGEMENT 575-5241
Joshua Warburton
Burns, OR 97720
17. OREGON STATE FORESTRY-CENTRAL OREGON DISTRICT 575-1139
John Boro, John Day Unit Forester
NW 9th
John Day, OR 97845

LIAISON PLAN

WENATCHEE NATIONAL FOREST

This plan is developed for coordination and liaison with and between cooperators, that could be affected or involved in the Wenatchee National Forest 1987 Western Spruce Budworm treatment project. It is intended to provide a functional system by which the project management team can have easy access to a high degree of technical information as well as to facilitate contracting participating agencies.

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1987 WESTERN SPRUCE BUDWORM COORDINATING DIRECTORY

WENATCHEE PROJECT AREA

<u>Position</u>	<u>Name</u>	<u>Office</u>	<u>Home</u>
Forest Spill Coord.	Grover Payne	(509) 662-4335	
Alternate	Doug Bowie	662-4335	
Alternate	Forest AO	662-4335	

District Spill Coordinator

Naches Ranger District	Jim Tyler	(509) 653-2205	
Alternate	Don Rotell	653-2205	
	Keith Hole	653-2205	

Forest Hydrologist		(509) 662-4335	
Forest Silviculturist		662-4335	
Forest Engineer		662-4335	
Forest Dispatcher	Doug Bowie	662-4335	
Forest PIO		662-4335	

State Agencies

Washington

DES (Dept. of Emergency Services)		(206) 753-5990	
Dept. of Ecology		(206) 575-2490	(24 Hr Spill Response)
Dept. of Game		(206) 575-2740	- District Officer
Dept. of Natural Resources - Ellensburg		(509) 925-6131	
Wash. State Patrol		(509) 575-2320	

County Agencies

Yakima County

Sheriff's Dept.		(509) 248-3530	
Hazmet Team		(509) 248-3530	

****NOTE**** F.A.A. Contact is to be handled thru the Wenatchee National Forest Supervisors Office. The contact is Doug Bowie or the Forest Air Operations Officer at (509) 662-4335.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER VIII

PUBLIC INFORMATION PLAN

CHAPTER VIII

PUBLIC INFORMATION PLAN

OBJECTIVES:

1. Keep the public posted on the progress of the spray project.
2. Reinforce public support by emphasizing the environmental safety and effectiveness of B.t.
3. Anticipate and answer public questions.
4. Keep employees informed.
5. Maintain communication with Wenatchee project.

TARGET AUDIENCES:

- * Employees of Malheur
- * Employees in Region 6
- * Project employees
- * Local media
- * Portland, Boise, and Bend media
- * Regional media list and wire services
- * Adjacent landowners (thru State Forestry rep)
- * Range permittees on Burns, Bear Valley, and Long Creek Districts
- * Recreation users
- * Contractors (tree planting and timber)
- * BLM - local offices
- * Local communities - Burns area and John Day area
- * Congressional staffs

ACTION PLAN

PHASE I - (Now - June 1)

<u>PLANNED ACTION</u>	<u>TARGET/OBJECTIVE</u>	<u>CONTACT</u>	<u>DATE</u>
Letter describing project	Range permittees & private landowners		3/87
Regional news release	Portland and Eastern Oregon media	Wagner	4/2
Forest newsletter	Malheur employees	Harris	4/15
Phone contact	Local BLM Offices	Butler & Silovsky	Wk 4/2
Develop list of key contacts - Re: project	Contact concerned public - Re: spray	Westerberg & Gary Larson	4/17

Action Plan (Continued)

<u>PLANNED ACTION</u>	<u>TARGET/OBJECTIVE</u>	<u>CONTACT</u>	<u>DATE</u>
Give receptionists campground closure info.	Public	Jackson	4/20
Maintain contact with receptionists	Feedback from	Jackson	Ongoing
Public meeting to share plans (use Paul Hart's slide program)	Communities and permittees	Jackson	5/87
Fact Sheet	Congressionals, local communities, and employees	Jackson	4/87
Place fact sheet & Forest Insect & Disease leaflet #53 in local stores & libraries	Local communities	Jackson	Wk 4/28
Visit Burns media	Resolve problems over perceived late news	Jackson	Wk 4/20
Prepare flyer or use fact sheet and make arrangements for it to be distributed with each woodcutting permit	Forest users - advise them of safety of B.t.	Jackson	4/20
Order two telephone lines as the field contact - one outgoing/one incoming	Simplify communications	Jackson	4/20
Develop crisis info. plan		Gibbs	4/27
Send "Media Day" invite - all Media (esp. TV) (include RO media person)	Public awareness campground closures	Westerberg Jackson	5/15 5/15
Develop list of special info., i.e., radios, etc.	interested parties	Jackson	5/30

PHASE II - IMMEDIATELY BEFORE SPRAYING (approx 6/1 - 6/15)

<u>PLANNED ACTION</u>	<u>TARGET/OBJECTIVE</u>	<u>CONTACT</u>	<u>DATE</u>
Introduce team to Forest employees at district meetings	Malheur and project employees	Evans	6/1
Develop community information posts about spray projects in Burns, John Day SO, Bear Valley, etc.	Project employees and local communities	Jackson	6/1

Action Plan (Continued)

<u>PLANNED ACTION</u>	<u>TARGET/OBJECTIVE</u>	<u>CONTACT</u>	<u>DATE</u>
Post notice in campgrounds	Forest users	Jackson District Emp.	6/1
Send DG message about start of the project	Malheur employees	Jackson	Spray day
Host Spiel	Project employees	Butler	Ongoing
Phone call to alert to beginning of project and offer field trip	Congressional staff	Westerberg	Spray day
Key Contact field trip (Torgeson??)		Westerberg	Spray day
Short news release or phone call regarding start of project.	Local media	Westerberg Jackson	Spray day
Media Day	Local, Boise, PDX, Bend media	Westerberg Jackson	6/15
Tell planters when spraying will take place		C.O.R.s Jackson	As needed
Personal contact	Adjacent landowners and other agencies	B. Nelson & G. Silovsky	As needed
Call RO media contact		Jackson	Daily
Coordinate with District Rangers so their people know they are expected to be up to date for field contacts.			Ongoing

PHASE III - SPRAYING

<u>PLANNED ACTION</u>	<u>TARGET/OBJECTIVE</u>	<u>CONTACT</u>	<u>DATE</u>
Lookout vantage	Local media?	Westerberg	Spray day
Daily DG update daily operations plan	Forest employees, RO, OR Dept. Forestry, and info spots	Jackson	Spray day
Weekly update news release for local media	Local media, BLM, congressional staffs	Jackson	Spray day

Action Plan (Continued)

<u>PLANNED ACTION</u>	<u>TARGET/OBJECTIVE</u>	<u>CONTACT</u>	<u>DATE</u>
Call appropriate landowners the day before their land is sprayed and other Agencies		Bryan Nelson	Daily
		G. Silovsky	Daily
<u>PHASE IV - END OF SPRAYING THROUGH END OF TESTING</u>			
<u>PLANNED ACTION</u>	<u>TARGET/OBJECTIVE</u>	<u>CONTACT</u>	<u>DATE</u>
Immediate news release to announce end	Local, Portland, Bend, Boise media	A. Gibbs or Jackson	7/12
Final release when effectiveness is known	Local, Portland, Bend, Boise media	A. Gibbs or Jackson	
Evaluate information program			
Send letters to papers expressing thanks for support from communities. (Note special acts)		Jackson/ Evans	Ongoing
Dismantle all local info centers	Cleaning house	Jackson	When over

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER IX

SAFETY PLAN

CHAPTER IX

SAFETY PLAN

I. PREFACE

The project safety plan is a plan of broad scope encompassing information from many sources. A list of sources can be found in the authority section of the plan. Agency directives will serve as the official documents should any differing opinions arise in the safety function of the project.

The safety staff will concentrate their efforts on advising team members of hazards occurring during the project, identifying ways to minimize hazards, or identifying ways to minimize the risks involved. Safety deficiencies will be corrected through the coordinated efforts of the project safety staff and the supervisory personnel involved. The project safety staff will emphasize prevention and find solutions to safety problems that affect the efficiency of the project.

Safety is a part of everyone's job performance on this project regardless of the level in the organization.

II. AUTHORITY

The safety program is an umbrella program encompassing the agreements, directives, guidelines, orders, regulations, and rules of the various agencies involved in this project. As a result of the multi-agency nature of this project, employees may fall under the authority of several documents regarding safe practices and procedures found in the following list:

Occupational Health and Safety Act

Oregon Revised Statutes, Chapter 654, Oregon Safe Employment Act

Washington Statutes

Executive Department Administrative Rule 14-070-01

Agency Bargaining Agreements

Department of Forestry Directives 5-1-3-902 and 5-1-3-903

Forest Service Manual (FSM) 5700

Forest Service Handbook (FSH) 6709.11 Health and Safety Code Handbook

FSH 5709.12 Helicopter Operations Handbook

Malheur and Wenatchee National Forest (MNF)

Aviation Management Plan

Malheur and Wenatchee NF Search and Rescue Plan

Malheur and Wenatchee NF Project Helicopter Operations Guide

Malheur and Wenatchee NF Aviation Operations Plan

Districts Emergency Plans

BLM Manual 1112

Office of Aircraft Services

1987 Contract for Helicopter/Fixed Winged on the Spruce Budworm Project

Oregon Occupational Safety and Health Code, OAR Chapter 437, 2437 Division 155, Hazard Communication.

III. POLICY

The safety and health of all personnel is of major importance. Therefore, the project's management has accepted the responsibility of preventing accidents in order that each employee may work in a safe and healthy environment and end each day without injury, illness or financial loss.

Injuries are always disturbing, often calamitous, and ever costly to the individual, their family, and the various agencies involved in this project. Consequently, the project's management has instituted a policy to promote safe practices to eliminate accidents and unsafe conditions.

An organized accident prevention program has been established to develop safety through awareness training, project planning and design, and supervision. Training is provided to give all employees the knowledge and benefits of safe practices both on and off the job. Project planning and design is utilized to provide the safest possible environment for all. The supervisor is responsible for reviewing daily safety procedures and to see that safety procedures are followed.

Some of the major points of our safety program require that:

1. All injuries and accidents be reported immediately to the appropriate supervisor and safety section.
2. Personal protective equipment, where required, must be worn by all employees.
3. Hazardous conditions and other safety concerns must be reported immediately to the appropriate supervisor and safety section.
4. Each employee shall comply with the occupational safety and health standards, rules, regulations, orders, and directives issued by their employer and applicable to their own actions and conduct.

Members of this project have the responsibility for their own safety, as well as the safety of their fellow employees. It is only by each employee becoming familiar with the hazards of their job and doing what is necessary to insure their safety that our project can achieve the safe working conditions deserved by all its members.

Finally, each employee has an important role in this safety program. That role being to strive for production and efficiency without accidents. Everyone is expected to join together to make this a successful, accident-free and healthy project.

IV. GOALS

- A. Prevent accidents and protect the safety and health of all project personnel on and off the job.
- B. Prevent property damage during the project.
- C. Maintain project efficiency with high safety standards.

V. OBJECTIVES

The objectives of this safety program are to establish and maintain a positive safety atmosphere which will:

- A. Stress the importance of a positive safety attitude and safe work practices on the part of all project personnel and recognize that all project personnel are part of the safety program.
- B. Prevent accidents both on and off the project.
- C. Maintain safety standards that meet or exceed requirements of the various agencies involved in the project.
- D. Establish and maintain positive inspection and investigation procedures.
- E. Maintain records of all incidents on the project and prepare statistical information for project supervisors as part of an ongoing monitoring process. Prepare a summary report at the completion of the project.
- F. Encourage open communications between project personnel, contractor employees and project management staff.

VI. RESPONSIBILITY

The project director has the ultimate responsibility for all activities during the project. This responsibility is assigned to various project supervisors throughout the organization. Safety is a part of each supervisor's job.

Project supervisors are responsible for implementing the project safety policy by providing supervision, leadership, organization, and evaluating employees on their safety performance.

It is the responsibility of all supervisors to promote a positive safety climate. Likewise, it is the responsibility of all employees to perform their work in a safe manner.

VII. PROCEDURES

A. Accident Prevention

1. Orientation and Training

- a. All project personnel will receive orientation and training to accomplish their job function.
- b. When appropriate, project personnel may be required to take a helicopter orientation class, defensive driving and first aid.
- c. All project personnel will participate in a pre-application orientation during the start up phase of the project.
- d. Project supervisors will train team members to recognize job hazards on an ongoing basis.
- e. Project supervisors are required to make safety briefings a regular part of their daily activities. These briefings are to be documented and submitted to the Safety Section.

2. Personal Protective Equipment

- a. Supervisors are responsible to identify hazards and insure that project personnel wear personal protective equipment when exposed.
- b. Equipment required for personal protection may include the following: aviation helmet, hard hat with chin strap, goggles for eye protection, safety glasses, fire resistant clothing (e.g. nomex jumpsuits or nomex shirt and pants), leather boots with non-skid soles (e.g. vibram lug sole), gloves of a type suited for the particular job assignment, long-sleeved shirt and long trousers, ear plugs or ear muffs, head lamps or flash light, individual first aid kits, and high visibility vests around operating aircraft.
- c. Project supervisors are responsible to see that team members have and wear the right type of protective equipment.

3. Hazard Inspections

- a. The safety staff will periodically inspect and monitor all project operations.

- b. All temporary facilities (e.g. headquarters, heliports, mixing sites, storage areas, or other bases of operation) will be monitored for safety hazards. Hazards will be documented and corrective action taken.
- c. Safety hazards identified during safety inspections will be communicated to the appropriate supervisor prior to the end of the daily work shift.
- d. Identified hazards will be corrected immediately by an appropriate means which may include, but is not limited to, removal of the hazard, signing, repair of building or equipment, replacement of defective equipment, closure of an area until the hazard can be eliminated, or training to minimize the risk of a particular hazard to an acceptable level. The Safety Section will assist supervisors in risk reduction and hazard management.

4. Air Operations Safety

- a. Supervisors in the air operations organization are responsible for safety efforts in the function of their operations.
- b. Air operations will meet or exceed Forest Service standards.
- c. Helicopter operations during this project are complex and hazardous. Exhibit 1, provides a general list of safety precautions. Exhibit 2, provides additional safety information related to helicopters.

HAZARD MAPS

Hazard maps will be prepared for each base heliport/helisport and will include, but not limited to:

1. Power lines.
2. Cables.
3. Towers.
4. Long line and helicopter logging areas.
5. Military low-level routes.
6. Congested areas.

These maps will show all the hazards within the normal dispatch area of the base heliport and will be updated continually with the latest hazards clearly marked.

Hazard maps will be posted at the heliports. Pilots and helicopter foremen shall be familiar with all aviation hazards in their area of operations.

5. Vehicle Safety

- a. Drivers are responsible for the safe maintenance and operation of their vehicle. Vehicles that are not safe to operate shall be grounded and repaired by the project mechanic, a local service department or other repair shop.

- b. Drivers will be trained to operate their vehicle. Project personnel must have completed a course on defensive driving, carry a current State driver's license, and a government driver's license, if applicable.
- c. Drivers shall check their vehicles daily. Such checks should include, but are not limited to, braking system, steering mechanism, tires, lights, wipers, horn, battery, fluid levels, and exhaust system. Each vehicle shall carry a fire extinguisher and first aid kit. A vehicle safety checklist will be available through the Safety Section.
- d. Exhibit 3 provides a general list of safety precautions for operators of motor vehicles.

6. Personnel and Visitor Safety

- a. Visitors to the project must check in at project headquarters. Visitors will follow the same safety guidelines as project personnel. Visitors to the project shall not jeopardize the safety of project personnel or the efficiency of the program.
- b. Personal protective equipment, where required, must be worn by all personnel visiting or working on the project. There will be no exceptions to this requirement. Supervisors are responsible to see that personal protective equipment is available and in use. Refer to personal protective equipment under accident prevention, Section 2.
- c. Personnel working at the headquarters office should keep the area orderly, clean and sanitary at all times.
- d. Exhibit 4 is a list of precautions for personnel working with the insecticide.
- e. Refer to Exhibit 5 for visitor safety guidelines.

7. Hazard Communication

Employees will be provided information and training at the time of assignment to the spray project. This training and information session will be part of the overall project orientation process.

Information topics will include, at least:

- a. Hazard communication rule requirements.
- b. Components of the employee's program.
- c. Operations where hazardous chemicals are present.
- d. Availability of program lists of chemicals and MSDS.

Training topics will cover, at least:

- a. How to obtain and use hazard information.
- b. Chemical hazards in the work area.
- c. Protective measures workers should use.

- d. Methods and observations used to detect the presence of hazardous chemicals.

The Hazard Communication Program for the project will be kept in the logistics section readily available to employees, their representatives, and the Accident Prevention Division.

8. Product (Specimen) Labels

During the application phase of the Spruce Budworm Project only one commercial product will be mixed with water then applied by helicopter or fixed wing aircraft. The product is *Bacillus Thuringiensis* more commonly known as B.t.

Bacillus thuringiensis (B.t.) is not designated as a hazardous material for the purpose of transportation by the Department of Transportation.

B.t. can be decontaminated using a solution of 5 percent bleach. Burial or ground surface disposal is an accepted procedure if there is no conflicting State regulation.

9. Traffic Control and Road Closures

- a. Any traffic control operation or closure of a public road will be done in cooperation with local law enforcement agencies and the agency with jurisdiction over the roadway.
- b. Refer to the liaison plan for a list of the agencies involved, such as, Grant County Sheriff's Department, Oregon State Police, State Department of Transportation, and the Grant County Road Department, etc.
- c. Plan to give the agencies advanced notice, 24 hours if possible.

10. First Aid Attendants

- a. The Oregon Safe Employment Act requires every employer having more than one employee to have a first aid attendant available at the job site. The first aid attendant is a person who has completed a Red Cross First Aid course or its equivalent and has a current Qualified First Aid card. All crews shall have at least one first aid attendant. Employees working alone will have a first aid card.
- b. Individual first aid kits will be provided to individuals on the project. Larger kits will be carried in vehicles and present at all heliport operations. Eye wash kits will be available to supplement the first aid kits.
- c. Project personnel will be provided a list of individuals on the project who are currently certified Emergency Medical Technicians (EMT's). Refer to EMT list, Exhibit 6.

11. Safety Meetings

- a. Safety meetings are recognized as an important part of the project program. Regular meetings of the safety staff will discuss accidents that may have occurred, near misses, unsafe acts, unsafe conditions, and preventative actions, etc. These meetings will provide information for briefing project supervisors. Safety meetings will be documented and kept on file with the safety staff.
- b. Daily safety meetings (tailgate sessions) will be required of all field operations. The meetings will discuss topics as listed in item a. above. These meetings should be documented via the supervisor's daily time report and/or minutes of crew meeting report. The latter is available from the safety staff.
- c. Before starting new procedures or entering hazardous situations, supervisors shall review appropriate safety considerations with team members. These discussions will occur as frequently as necessary and could be on a daily or hourly basis.

DISASTER PREPAREDNESS

In order to be ready to render assistance in the event of an emergency, each base heliport and heliport must have a plan. It shall be posted in a prominent place, and each person on duty shall be fully appraised of their responsibilities. Information shall be kept current. The plan should contain, but not be limited to:

- (1) Training of personnel.
- (2) Rescue/evacuation equipment.
- (3) Report forms.
- (4) Flow charts depicting chain of events to get search/rescue operation in motion.
- (5) List of hospitals with locations and facilities. Hospitals on the list should each receive information concerning emergency procedures around helicopters.
- (6) A list of emergency telephone numbers, including;

(a) Forest Supervisor's Office

- Fire and Aviation Management
- Forest Safety Officer
- Public Information Officer
- Forest Dispatcher

(b) Regional Office

- Regional Safety Officer
- Fire and Aviation Management
- Regional Public Information Officer
- Regional Fire Coordinator/Dispatcher

- (c) FAA Tower if available and operating
- (d) Crash/Rescue at the Airport
- (e) Flight Service Station
- (f) Local Ambulance
- (g) Local Hospital
- (h) County Sheriffs

B. Accident Reporting and Emergencies

1. Forms and Guidelines

- a. All accidents resulting in equipment or property damage or injuries shall be reported to the supervisor in charge of the activity. When the accident results in a personal injury, immediate first aid will be rendered. For minor injuries, involving first aid only, the incident will be documented. Temporary employees will fall under the guidelines of the hiring agency. Refer to Exhibit 7.
- b. All compensable injuries requiring medical assistance must receive prompt attention.
- c. Safety staff will assist supervisors in completing all reports and records of a personal injury, accident or property damage. If additional assistance is needed, requests will be coordinated through headquarters personnel.
- d. Time is critical when submitting accident documentation. Only those persons required to complete paperwork will be utilized so as not to impede the progress of field operations.
- e. If an employee is absent from the project as a result of injury, replacement or reassignment will be coordinated through the appropriate supervisory channels.
- f. All forms, records, and guidelines will be available through headquarter's office and in the safety section.

2. Emergency Medical Plan

- a. An emergency medical plan will be posted at the headquarters and at all satellite bases. See Exhibit 8.
- b. In the event of an emergency notify headquarters immediately. Request a member of the safety staff to assist in onsite coordination if needed.
- c. Refer to the liaison section for coordination.

3. Accident Investigation

- a. In all cases of personal injury, vehicle or property damage accidents, notify the project headquarters.
- b. All accidents will be investigated. The level of the investigation will depend on the severity of the incident.
- c. The safety staff will coordinate accident investigations and assist supervisors in completing the required paperwork.
- d. Depending on the nature of the incident, the investigation may require assistance beyond that available at the project. Determinations will be made on a case-by-case basis dependent upon the details of the accident and the potential for a more serious accident to happen.
- e. Alleged damage claims will be investigated by the Finance Section assisted by the safety staff. The Finance Section will work directly with the Project Manager and Safety Chief.

4. Search and Rescue

In the event an aircraft is downed or missing or a serious accident occurs, the following personnel will initiate the listed actions:

a. Unit Manager (of the affected team)

- (1) Assumes the role of the on-site coordinator of the search and rescue mission.
- (2) Notify the dispatcher immediately.
- (3) Initiate a search pattern with the resources on hand (i.e. vehicle or aircraft).
- (4) Record all information relative to the search and rescue mission.
- (5) Suspend any or all portions of the team's operation which might hinder the search and rescue mission.
- (6) Maintain communications with headquarters and request help if a larger search is required than possible with the resources on hand.
- (7) Confirm the situation as soon as possible and shift to the rescue mission if necessary.

b. Dispatcher

- (1) Receive the report and record all pertinent information (see Search and Rescue Report Form as an example of information needed, USDA R-6 1590 Exhibit 9).

- (2) Immediately request backup dispatcher to handle other operation functions.
- (3) Dispatcher notifies team members.

SUSPECTED EMERGENCY (Contacts)

- (a) Unit Director
- (b) Safety Chief
- (c) Law Enforcement
- (d) Public Information Officer
- (e) Project Director

CONFIRMED EMERGENCY

- (a) Notify responding emergency agencies (see Emergency Medical Plan).
- (b) Unit Director
- (c) Safety Chief
- (d) Law Enforcement
- (e) Public Information Officer
- (f) Project Director
- (g) Make notification to all cooperating agencies as time permits, depending on the incident.

c. Unit Director

- (1) Establish contact with the team leader and coordinate the search and rescue effort.

NOTE: It is important that nonaffected teams do not respond on their own initiative. Uncoordinated converging aircraft will create additional hazard. Nonaffected teams should continue normal spray operations unless diverted to rescue operations by the Project Director.

- (2) Act as the person in charge of the situation and coordinate responding agencies or individuals.
- (3) Establish a team of assistants to help manage the situation.

It is extremely important that accurate information is recorded by members of the search and rescue effort. Remember, take immediate action and keep a log of the action taken or observed.

CRASH RESCUE

Crash rescue plans should be directed toward the helicopter foreman or the air service manager, heliport and airport. Plans should be designed for Forest Service and contract aircraft, but should be capable of being used for any aircraft--military, commercial, or private.

The following guidelines may be used to assist units in developing emergency/crash-rescue plans suited to local conditions.

1. Overdue Aircraft. An aircraft is considered overdue 30 minutes after filed arrival time.

a. Helicopter foreman or air service manager, heliport will:

(1) Get all of the following information available:

- (a) Name of pilot
- (b) Names of passengers/crewmembers (how many?)
- (c) Aircraft registration number
- (d) Type of aircraft
- (e) Color of aircraft
- (f) Type of mission
- (g) Last known location
- (h) Point of takeoff
- (i) Point of intended landing.
- (j) Was flight plan filed with FAA/FS Dispatcher (which)?
- (k) Time aircraft was due at destination
- (l) Call Forest Dispatcher

b. Forest Dispatcher will:

- (1) Call local FAA Flight Service Station.
- (2) Notify then Forest Aviation Officer.
- (3) Notify the Regional Office:
 - (a) Regional Aviation Officer
 - (b) Regional Safety Officer
- (4) Notify local law enforcement.

If aircraft is not located within 1 hour and 30 minutes after becoming over due, FAA will notify the Rescue Coordination Center at Scott AFB, Illinois.

c. Complete Form FS-5700-14, Aircraft Accident Incident Report.

2. Crashed Aircraft

a. Rescue

- (1) Assist survivors and render first aid until relieved by medical personnel.
- (2) If there is danger of post crash fire - move survivors a safe distance away.
- (3) Keep bystanders and unauthorized personnel out of the crash area.
- (4) Establish "NO SMOKING" rule. Fire and explosion are dangers with residual fuel and hot metals.
- (5) Search the wreckage carefully for other survivors.
- (6) Notify the Regional Safety Officer through command channels.

- (7) Preserve the accident site. Every piece of the aircraft and its location is important to the investigators. Nothing should be disturbed. Use local law enforcement personnel to secure site, if available.
- b. Call local crash rescue, if available.
- c. Call Forest Dispatcher.
- d. The Forest Dispatcher will:
 - (1) Notify Forest Aviation Officer.
 - (2) Dispatch contract helicopter (if available) with emergency medical technician.
 - (3) Evacuate injured, notify hospital, doctor.
 - (4) Notify local law enforcement.
 - (5) Notify Regional Office:
 - (a) Regional Aviation Officer
 - (b) Regional Safety Officer
- e. Identify witnesses.
 - (1) Obtain written statements, if possible.
 - (2) Obtain name, address, phone numbers.
- f. Complete form FS-5700-14.

MEDIVAC

(Air evacuation of the sick and injured). In order to effectively render aid to sick and injured persons on National Forest land and care for Forest Service employees who may need emergency treatment or evacuation by helicopter, preplanning is necessary. The following guidelines may be used to assist units in planning medivac operations.

1. Trained Personnel

- a. If units have EMT trained personnel on air crews, these people should have staggered tours of duty to cover the operation throughout the day.
- b. On heliports, one priority of the air service manager is to identify qualified personnel and place equipment for immediate use.

2. Rescue and Evacuation Equipment

Standard rescue and evacuation kits stocked at the Boise Inter-Agency Fire Center or Redmond Air Center should be available at heliports.

INFORMATION COMPILATION

The Dispatcher and each of the base heliport/heliport shall keep the following information current and readily accessible.

1. A file of hospital admittance information on each Forest Service employee on the project.
2. An information file on local hospitals within 50 miles of the Forest boundary.
3. A list of hospitals with heliports.
4. Address and telephone number of the nearest poison information center.
5. Address and telephone number of the nearest decompression chamber.
6. Address and telephone number of the nearest burn treatment center.
7. A readily available copy of all Forest Service policy concerning search and rescue (FSM 1590, 5700).
8. A readily available copy of the memorandum of understanding between the Forest and the county sheriff's office.
9. Telephone number of the nearest FAA Flight Service Station.
10. Telephone number of the Regional Aviation Officer.
11. Telephone number, for obtaining crash/rescue trucks and trained personnel from other sources.
12. A local sectional aeronautical chart (to coordinate in-flight navigation instructions with pilots).
13. (Each base heliport) a diagrammatic drawing of the helicopter stationed at that base, showing positions of door jettison handles, fire extinguishers, hydraulic reservoirs, oil tank, first aid kit, battery, fuel tanks, and fuel shut-offs. Each crewmember should be familiar with this information.

EXHIBIT 1

HELICOPTER AND FIXED WING SAFETY PRECAUTIONS FOR ALL FIELD OPERATIONS PERSONNEL

1. Pre-plan flight routes with the pilot and discuss local hazards.
2. Plan for potential conflicting air space uses, such as military low level flight routes and high voltage powerline corridors.
3. Be aware of potential sites for forced landings.
4. Consider the very low angle sun rays during early morning flights: avoid flying from sun into shadows if possible.
5. Pay attention to changes in wind direction.
6. Pilot will have the final say in the operation of the helicopter and the safety of flight routes.
7. Do not overload aircraft.
8. No flying during hazardous winds and poor visibility.
9. Maintain radio communications and check-in every 15 minutes. Do not fly with inoperative radio equipment.
10. Avoid flight patterns that laterally place spray aircraft too close.
11. Personnel should stay at least 100 feet from helicopter landing sites.
12. Never approach a landing helicopter until the pilot signals to do so.
13. Escort passengers to and from the running helicopter by the heliport manager unless otherwise authorized by the project director.
14. Always approach and leave helicopter from side or front in full view of the pilot at all times.
15. Keep in a crouched position while approaching or departing helicopter.
16. Stay away from the tail rotor.
17. Never approach or leave ship from a side where ground is higher than the ground where helicopter is sitting.
18. A qualified person must load the equipment.
19. Never enter helicopter until pilot gives okay; enter carefully so as not to interfere with controls, cables, or pilot.
20. Do not slam, bang, or force aircraft door; learn how to open doors from the outside and inside.

Exhibit 1 (Cont.)

21. Always wear safety goggles when within 100 feet of a landing, hovering, or a helicopter taking off.
22. Keep seat belt and shoulder harness fastened until the pilot gives the signal to exit.
23. Observation personnel shall wear aviation helmets, fire resistant flight suit, nomex or leather gloves, and leather boots. Gloves, flight suit and boots will overlap a minimum of 2 inches when sitting in the helicopter. Do not wear synthetic material under the flight suit.
24. Wear ear plugs or ear muffs around operating helicopters. Always fasten chin strap of helmet when working around helicopters.
25. Keep the heliport clear of debris.
26. No smoking within 100 feet of any refueling area. If individuals need to smoke, designate a smoking area.
27. The touchdown area for helicopters should not exceed 3 percent. Clearly mark all heliports. Allow for a safety circle of one and a half times the diameter of the main rotor.
28. Carefully plan the layout of heliport equipment. Consider the placement of fueling areas, insecticide handling and storage, fire extinguisher location, parking, and helicopter operations.
29. Never fuel an operating aircraft. Be sure blades and rotor are completely stopped.
30. Adhere to safe fueling procedures. Be aware of grounding and bonding requirements. Be aware of the hazards of aviation fuel.
31. Keep unauthorized personnel away from the helicopter operations.
32. Coordinate flight paths and landing patterns of observation and spray aircraft.
33. Report malfunctioning aircraft.
34. Keep spray pilots briefed on operation plans, changes, weather forecasts, land features, elevations and other critical or sensitive elements that may affect their operation of helicopter.
35. Pilots must follow contract regulations and provisions.
36. Be aware of flight hour-duty limitations.

Exhibit 1 (Cont.)

FIXED WING SAFETY PRECAUTIONS FOR ALL FIELD OPERATIONS PERSONNEL

1. No passengers other than those authorized by the Forest Service may be carried on flights.
2. Except for landings and take-offs, no flight below 500 feet above ground level is permitted in fixed wing aircraft.
3. No night passenger flights shall be conducted in single-engine fixed wing aircraft.
4. No flights shall be conducted in instrument conditions in single-engine fixed wing aircraft, except to pass through a cloud layer or similar condition; such flight not to exceed 15 minutes. In these cases, both plane and pilot must be IFR qualified.
5. Always know where you are, where the nearest air strip is, and the nearest terrain suitable for an emergency landing.
6. When landing on remote air strips, look the strip over thoroughly before you commit yourself to landing.

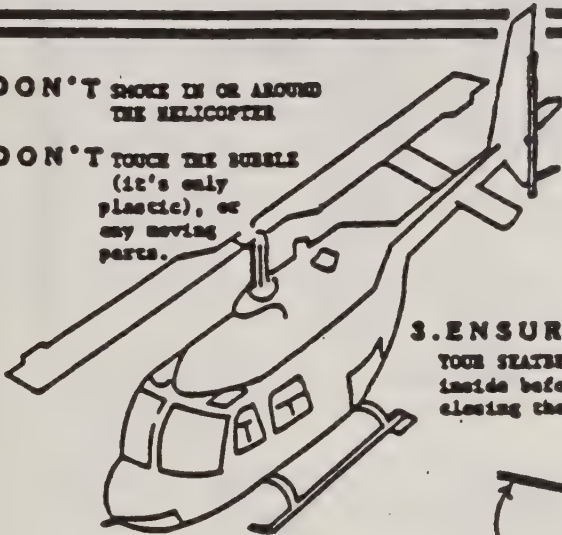
EXHIBIT 2

ADDITIONAL HELICOPTER SAFETY INFORMATION

BE ALERT AND LIVE AROUND THE HELICOPTER

1. DON'T SMOKE IN OR AROUND THE HELICOPTER

2. DON'T TOUCH THE BUBBLE (it's only plastic), or any moving parts.



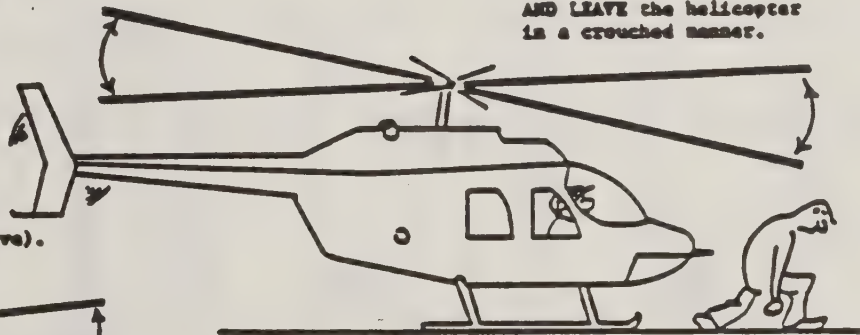
3. ENSURE YOUR SEATBELT is inside before closing the door.

8. PROTECT YOURSELF

- a. FASTEN SEATBELT ON ENTERING helicopter and leave it fastened until the pilot signals to get out.
- b. ASK THE PILOT about emergency exits and escape procedures.
- c. DRESS for the operating environment.
- d. KEEP WELL CLEAR of landing or taking off, especially with external loads.
- e. SHIELD YOUR EYES near a helicopter when it is landing or taking off.
- f. FRONT PASSENGER will unload other passengers at an unmagged spot.

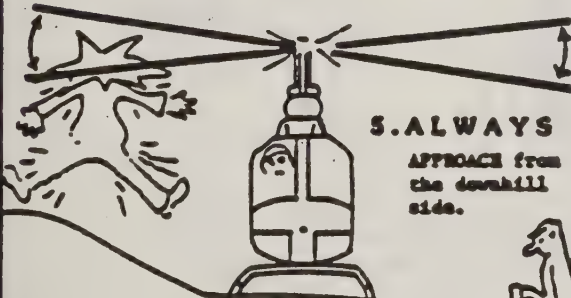
9. APPROACH

AND LEAVE the helicopter in a crouched manner.



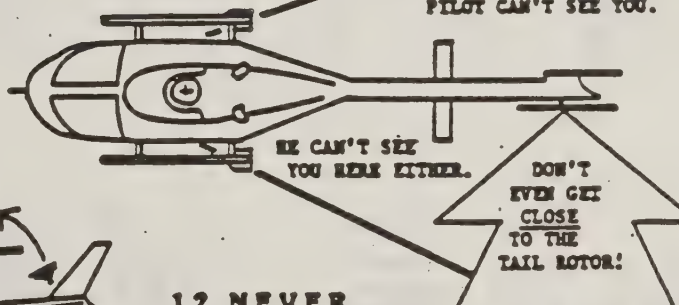
4. NEVER

APPROACH OR LEAVE UPHILL (Rotor blades are expensive).



5. ALWAYS APPROACH from the downhill side.

10. WHEN DIRECTING THE HELICOPTER, stand with your back to the wind, arms outstretched in the direction of the pad.



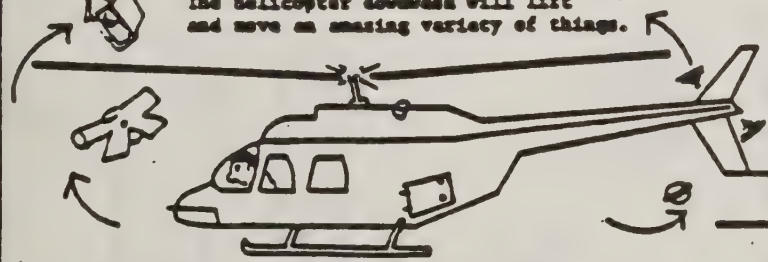
11. ALWAYS AVOID THIS BLIND AREA. THE PILOT CAN'T SEE YOU.

HE CAN'T SEE YOU HERE EITHER.

DON'T EVEN GET CLOSE TO THE TAIL ROTOR!

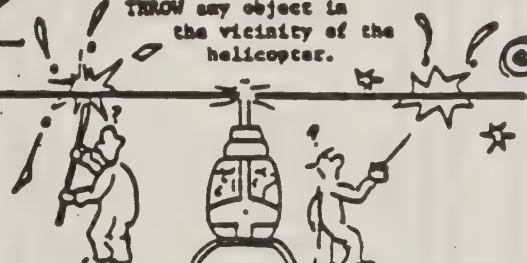
6. KEEP

THE LANDING AREA CLEAN. The helicopter downdraft will lift and move an amazing variety of things.



12. NEVER

THROW any object in the vicinity of the helicopter.



7. DON'T

SLAM THE DOORS, but close them gently and don't let them swing in the wind.



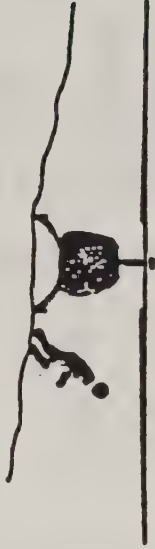
13. CARRY TOOLS and other long objects horizontally below waist level, not upright or over shoulder.

14. HOLD ON TO YOUR HAT!

SAFETY AROUND HELICOPTERS



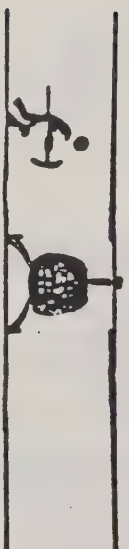
1) Approach and depart helicopters from the side or front in a crouching manner.



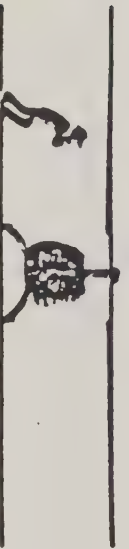
2) Approach and leave on the down slope side (to avoid main rotor).



3) Approach and leave in pilot's field of vision (to avoid tail rotor).



4) Carry loads horizontally, below waist level (never upright or over shoulder).



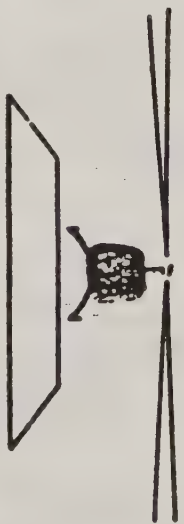
5) Hold onto hard hat when approaching and leaving helicopter, unless chin straps are used.



6) Fasten seat belt on entering helicopter and leave it buckled until pilot signals you to get out.



7) Do not touch bubble or any of the moving parts (tail rotor linkage, etc.).



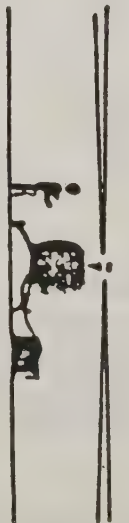
8) Keep helispot clear of loose articles — water bags, ground sheets, empty cans, etc.



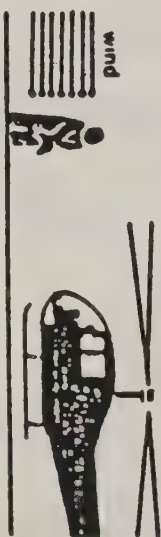
9) Do not throw anything from the helicopter while in flight or on ground.



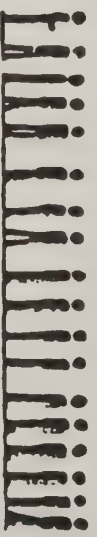
10) Loading assistants should always be equipped with plastic eye shields.



11) After hooking up cargo sling, move forward and to side to signal pilot (to avoid entanglement and getting struck, with loading sling).



12) When directing landing, stand with arms crossed in front of body and pointing downward. Stand with back to wind.



13) When moving larger crews:

- a) Brief them on above safety precautions.
- b) Keep them together and well back at side of landing zone.
- c) Have them face away from helicopter during landing and take-offs.
- d) Have men paired off and ready to get aboard, as soon as pilot gives the signal.

14) No Smoking:

- a) During take-off or landing.
- b) In the landing area.
- c) During approach.
- d) Without pilot's permission.

EXHIBIT 3

SAFETY PRECAUTIONS FOR MOTOR VEHICLE OPERATORS

1. Pay attention to road surface. Vehicles handle differently on pavement, dirt, or gravel road surfaces.
2. Pay attention to road width, particularly when leaving well traveled paved roads.
3. Be aware of changes in road grade.
4. Watch out for blind curves, dust from other vehicles, and the effects of flickering sunlight through the forest canopy.
5. Always drive to the right. Watch out for other traffic (logging trucks, public visitors, etc.).
6. Drive defensively; drive at a speed that will allow you to stop within one-half your sight distance.
7. Keep your windshield and headlights clean. Use your headlights at all times when driving.
8. Park vehicles out of the flow of traffic. Use wheel chocks in addition to the parking brake.
9. Select safe areas to turn around. Be aware of soft shoulders on forest roads.
10. Keep the vehicle cab clean and free of tools and debris.
11. Make vehicle safety inspection each day, using the Vehicle Safety Check List. All safety items must be corrected before operating. Vehicle Safety Check Lists are available from the safety section.

EXHIBIT 4

SAFETY GUIDELINES FOR USE OF INSECTICIDE - BACILLUS THURINGIENSIS

1. Avoid contact with the skin; wear water proof rubber gloves (gauntlet type) as needed.
2. Avoid liquid splash to the face, particularly the eyes: wear goggles or safety glasses.
3. Avoid liquid splash to clothing: wear coveralls or change clothing regularly if splashed with insecticide.
4. If contact with the insecticide occurs flush with plenty of water and get medical attention if irritation occurs and/or persists. Report the incident to the safety officer or safety chief.
5. Wash hands with soap and water before handling food (eg. eating or smoking).

EXHIBIT 5

VISITOR SAFETY GUIDELINES

All visitors shall abide by the same operation safety guidelines that apply to the project personnel.

Visitors shall include members of the public, media representatives and others not directly involved in the project.

1. Visitors to the project must check in with the Public Information Officer at Headquarters before traveling to any part of the project.
2. Visitors to the projects shall not jeopardize the safety of project personnel or the efficiency of the program.
3. Visitors to the project shall not be permitted to enter heliports and other operational areas without a Project Public Information Officer or other authorized project personnel.
4. Unit Directors will determine specific safety restrictions for visitors at each heliport or project operation. The Unit Director has the option to prohibit visitors at the heliport or operation if their presence in any way compromises the safety and efficiency of the operation.
5. In the event of an injury or other incident, visitors may be directed by the Unit Director, Safety Chief or his designated representative, to leave or move to an area which does not interfere with the emergency management effort.
6. Information concerning incidents and emergencies will be provided to the Public Information Officer by the Unit Director or Safety Chief or his designated representative.

Information will not be released about an incident or emergency until it is cleared with the Project Director and Public Information Officer.
7. News media personnel wishing to fly aircraft over the project, must contact the Public Information Officer and coordinate the flight with the Operations Manager.

EXHIBIT 6

EMERGENCY MEDICAL TECHNICIANS (EMT)
FIRE MEDICAL TECHNICIANS (FMT)

NAME	TITLE	WORK PHONE	HOME PHONE	KITS	REMARKS
ROBERTA MORIN	FMT	575-1731 EXT 424	446-3385	EMT & JUMP	LIVES 60 MILES AWAY.
RON QUINLIN	EMT	575-1731 EXT 306	932-4943	AT HELIPORT	HELITACK
CLAY ARNELL	EMT	575-1731 EXT 306		AT HELIPORT	HELITACK
LELAND BLISS	EMT	575-1731 EXT 306		AT HELIPORT	HELITACK
SAM PALMER	EMT	575-1731 EXT 306		AT HELIPORT	ON DUTY JUNE 15
MIKE TATUM	EMT	820-3311 EXT 438	820-4556	NO KIT	PRAIRIE CITY RD
BILL JACKSON	EMT	820-3311 EXT 438	820-4436	NO KIT	PRAIRIE CITY RD
BILL PROPHET	EMT	575-2110 EXT 82-546	575-2556	NO KIT	BEAR VALLEY RD
RICK REITZ	EMT	575-2110 EXT 82-518			LONG CREEK RD
BARB MILLER-SOHR	EMT	525-2110	575-0187		BEAR VALLEY RD PART TIME EMPL.
JIM CAMPBELL	EMT	573-7292 EXT 641	573-7607		SNOW MTN. RD BURNS
JOHN STEVENSON	EMT	573-7292 EXT 641	573-7941		SNOW MTN. RD BURNS
JIM TROWBRIDGE	EMT				ASSIGNED TO PROJECT
STEVE BAUMANN	EMT				ASSIGNED TO PROJECT(CHECK)
STEVE CULP	EMT				ASSIGNED TO PROJECT
DON WILSON	EMT				ASSIGNED TO PROJECT

SOME EMT'S HAVE KITS WHILE OTHERS DO NOT. IF WE HAVE A NEED TO USE ANY OF THE ABOVE LISTED PEOPLE, THEY NEED TO BE NOTIFIED IN ADVANCE SO THEY CAN HAVE PROPER COMMUNICATION AND FIRST AID SUPPLIES.

EXHIBIT 7

HANDLING ACCIDENTS AND INJURIES

A. VEHICLE ACCIDENTS

1. In the event of a vehicle accident, the Dispatcher will be called immediately. The operator of the vehicle shall provide assistance as needed. The dispatcher will notify the Unit Manager and the safety section.
2. Gather all the details of the accident and record them on the accident forms provided in the vehicle.
3. If the accident involves a private rig that is rented for the project, gather the same information as in item 2 above.
4. If a private vehicle (not associated with the project) is involved, be sure to obtain the ownership and insurance information.
5. Unless the vehicles involved are a hazard to other traffic, do not move them until the accident investigator reaches the scene. If it is necessary to move them, be sure to draw a diagram of the scene.
6. The investigation will be handled by the Project Supervisor, assisted by the safety section.

B. PERSONAL INJURY

1. Minor injury with only first aid required.

Administer first aid as needed. Prepare proper form and turn in to the Administrative Officer. Report the incident to the safety section.

2. Minor injury that requires further medical attention.

In the event that the injury is severe enough to require further medical treatment (for example, stitches for a laceration), it will be necessary to arrange to take the injured party to a medical facility. If possible, the injured party should be brought into headquarters first to have the necessary paperwork completed. If this is not possible a representative from headquarters will meet the injured party at the medical facility to authorize treatment.

Report the incident to the Dispatcher, although unnecessary details need not be transmitted over the air. Also report the incident to the safety section.

Exhibit 7 (Cont.)

3. Major injury requiring ambulance service or medevac.

If the injury is severe enough that an ambulance or helicopter is needed to transport the victim, the dispatcher must be notified so that one can be ordered.

It will be necessary for a project vehicle meet the ambulance to guide it to the scene. The dispatcher will determine the meeting place.

Proper ground-to-air signals will have to be used if the victim is to be transported by helicopter.

As in item 2, above, a representative from headquarters will have to meet the injured party at the hospital with the required paperwork.

Report the incident to the Unit Manager and safety section.

C. DOCUMENTING INJURIES

Whenever an individual is injured in an on-the-job related accident they must fill out the proper forms depending the agency they work for or are employed under. The forms are only to document an injury in case of further complications in the future.

The appropriate forms can be obtained from the Administrative Officer or the safety section. Do not delay in filling out the forms as there may be a deadline.

D. REPORTING A FATALITY

When a fatality occurs on job-related activities, certain persons must be notified and certain steps must be taken. No project personnel are authorized to provide any information pertaining to the incident to the press, radio, TV, or next of kin. The release of information is done by the County Sheriff or State police. Once the next of kin are notified any additional accident details will be released only by the accident investigator in coordination with the Project Director and the Public Information Officer.

Additional notification will be required to the various agencies involved.

The immediate supervisor (at the scene) is responsible for seeing that the following precautions are followed:

1. Do not move the body, except in cases where the body is in danger of being destroyed at its present location.
2. Try to establish positive identification to use in making your report.
3. Do not release the victim's name (except to the County Sheriff, State Police, and Project Director) and do not use name on the project radio.

Exhibit 7 (Cont.)

4. Help the Coroner or his representative if assistance is requested to transport the remains. Mark the location of the body on the ground and note the location of any tools, equipment or other personal gear.
5. Do not allow unauthorized picture taking or release of pictures.
6. If you have to move the body, take pictures if possible. If you do not have a camera, get two or three people present to view the scene and make mental notes on details that can be used later to prepare statements. Draw a picture of the scene.
7. Refer all requests from news media for information to the County Sheriff or State Police until the next-of-kin have been notified. The County Sheriff or State Police will advise the project staff when further information can be released.

EXHIBIT 8

MALHEUR MEDICAL SERVICES PLAN

HOSPITALS

HOSPITAL	LOCATION (Address)	PERSON IN CHARGE	HELI SPOT	HOURS
BLUE MOUNTAIN HOSP	170 FORD RD. JOHN DAY, OR. 97845 phone: 575-1311	DONNA KRAUSE phone: 575-1311	YES	24 HR.
HARNEY COUNTY HOSP.	557 W. WASHINGTON BURNS, OR. 97720 phone: 573-7281	DALE WHITE phone: 573-7281 phone: 573-6356	YES	24 HR.
EMANUAL BURN CENTER	PORTLAND, OR. phone: 280-4233			

AMBULANCE SERVICES

JENELLE GALBREATH 575-0300

JOHN DAY 575-0300 (GROUND)

BURNS 573-7281 (GROUND)

LIFEGUARD III - LAGRANDE - 963-3500 OR 1-800-426-5554

LIFEGUARD - PENDLETON - 1-800-247-7740

AIR LIFE OF OREGON, INC. - BEND - 1-800-621-5433

When ordering an Air Ambulance you must give them the radio frequency that we are working on. There isn't a practical way we can have or even use their frequencies. They have the capability of coming up on our frequency when they get in the area.

THE PHONE NUMBER OF THE NEAREST POISON INFORMATION CENTER IS 1-800-452-7165

THE NEAREST DECOMPRESSION CHAMBER IS PORTLAND, OREGON.

THE NEAREST FAA FLIGHT SERVICE STATION IS IN PENDLETON, OR. 276-3811 OR 276-7754

Exhibit 8 (Cont.)

The use and/or request of medical facilities or ambulance services (ground or air) must be approved through the base headquarters in John Day.

Air ambulances (helicopters) are available from Pendleton, La Grande or Bend Or. They also must be requested through the base headquarters in John Day. When requesting an Air Ambulance give them the radio frequency that will put them in contact with the people on the ground at the injury site.

Air Ambulance

Air Ambulance service can be off the ground in approximately 20 minutes.

Dispatch needs to provide the Air Ambulance with the following information:

- Location: T. R. S. on longitude/latitude .
- Radio frequency to use.
- Person to contact on-the-ground.
- Type of injuries.

Dispatcher needs to consider area where the Air Ambulance will be used to ensure the closest source is used. (LaGrande, Pendleton or Bend).

Additional data may be obtained as the project gets underway.

FOREST SEARCH AND RESCUE PLAN

GRANT COUNTY SHERIFF (BOB WALKER)	OFFICE - 575-1131	HOME - 575-0853
HARNEY COUNTY SHERIFF -	573-6156	
CITY DISPATCHER -	575-0030	
FIRE DEPARTMENT - JOHN DAY - 911	575-1131	

If our people are lost and we activate a search we should notify the sheriff's office. Any other search and rescue missions have to be coordinated through the sheriff's office.

EXHIBIT 8

WENATCHEE MEDICAL SERVICES PLAN

<u>HOSPITAL</u>	<u>HOURS</u>	<u>PHONE</u>	<u>FREQ.</u>
YAKIMA VALLEY MEMORIAL HOSPITAL 2811 Tieton Drive, Yakima	24 Hrs.	575-8100	155.340 Helipad
ELIZABETH HOSPITAL 110 S. 9th Avenue, Yakima	24 Hrs.	575-5060	155.340 Roof Heliport
MEDIC I (AMBULANCE) 508 S. 5th. Avenue, Yakima	24 Hrs.	248-3610	155.340
CHELAN - Manson Ambulances	Chelan 911 or	682-2588	155.340

SEATTLE - SPOKANE AREA

HARBORVIEW MEDICAL CENTER/HOSPITAL/BURN UNIT Seattle **Helipad located at southwest corner of hospital directly above I-5.		206-223-3000	155.340
SACRED HEART HOSPITAL/BURN CENTER Spokane	24 Hrs.	455-3131	155.340
POISON CENTER Yakima	24 Hrs.	1-800-572-9176	

SEARCH & RESCUE INFORMATION REPORT

1. AGENCY REPORTING _____ DATE _____ TIME _____
2. AGENCY EMPLOYEE'S NAME _____ PHONE No. _____
3. NAME AND ADDRESS OF PERSON REPORTING ACCIDENT _____

 (IT IS IMPERATIVE THIS PERSON BE DETAINED UNTIL CONTACTED BY MEMBER OF SHERIFF'S DEPT.)
4. CAN PERSON WHO REPORTED ACCIDENT BE REACHED BY PHONE? _____ NUMBER _____
5. CAN HE ACCOMPANY THE RESCUE PARTY BACK TO THE SITE, IF NOT, WHO CAN? _____
6. NUMBER OF PERSONS INJURED OR LOST _____
7. TYPE OF INJURIES _____
8. LOCATION OF ACCIDENT & LANDMARKS _____
9. TIME OF ACCIDENT _____ DATE _____
10. NAMES AND AGES OF PERSONS INJURED _____
11. NAMES AND ADDRESSES OF OTHER PERSONS IN PARTY INVOLVED _____

12. HAS INJURED PERSON FOOD AND WARM CLOTHING? _____ IN SHELTERED PLACE? _____
13. EXPERIENCE OF PARTY _____
14. EQUIPMENT OF PARTY FOR THEIR RESCUE OR USE _____
15. KIND OF TERRAIN (A) ROCK, BRUSH, TIMBER, SNOW, GLACIER, OTHER _____ ALTITUDE _____
 (B) LAKE, RIVER, SALT WATER _____ DEPTH _____ FAST OR SLOW CURRENT _____
16. WEATHER AT SITE _____
17. TIME INVOLVED - HOW LONG DID IT TAKE FOR THE REPORTER TO COME OUT? _____
18. IS AERIAL SUPPORT PRACTICAL? _____ SEARCH _____ EVACUATION _____
 LANDING SITES _____
19. BEST ROUTE OR APPROACH _____
20. ARE ANY OTHER AGENCIES INVOLVED? _____
21. WHAT HAS BEEN DONE OR IS NOW BEING DONE? _____
22. AVAILABILITY OF LOCAL MEN _____ EQUIPMENT _____
 OTHER AIDS _____
23. ARE MAPS AND PHOTOGRAPHS OF AREA AVAILABLE? _____
24. ADDITIONAL COMMENTS _____
25. SHERIFF NOTIFIED - TIME _____ DATE _____
26. SUPERVISOR NOTIFIED - TIME _____ DATE _____

EXHIBIT 9

SEARCH AND RESCUE REPORT FORM

(Rescue operations depend on having all the facts)

1. Source of initial information

a. Name _____

b. Address _____

c. Phone _____

d. How did he receive knowledge of accident? _____

2. Time of crash or accident Date _____ Hour _____

3. Type of accident

Plane crash _____ Lost person _____ Mountain climbing _____

Avalanche _____ Other (specify) _____

3a. Airplane crash

a. Type of aircraft _____

b. Action of Plane before crashing - on fire, explode, etc.

4. Description of accident _____

5. Condition of victim or victims _____

6. Doctor needed Yes _____ No _____

7. Location of airplane crash or accident

T. _____ R. _____ Sec. _____ Sub-division _____

8. Location by local landmarks _____

9. Number of men, their experience and equipment, dispatched to accident

10. Men and equipment needed _____

Terrain (snow, ice, rocks, etc) _____

Where should they report _____

11. What other agencies have been notified? _____

12. Signature _____

Date

Time

Address _____

Phone _____

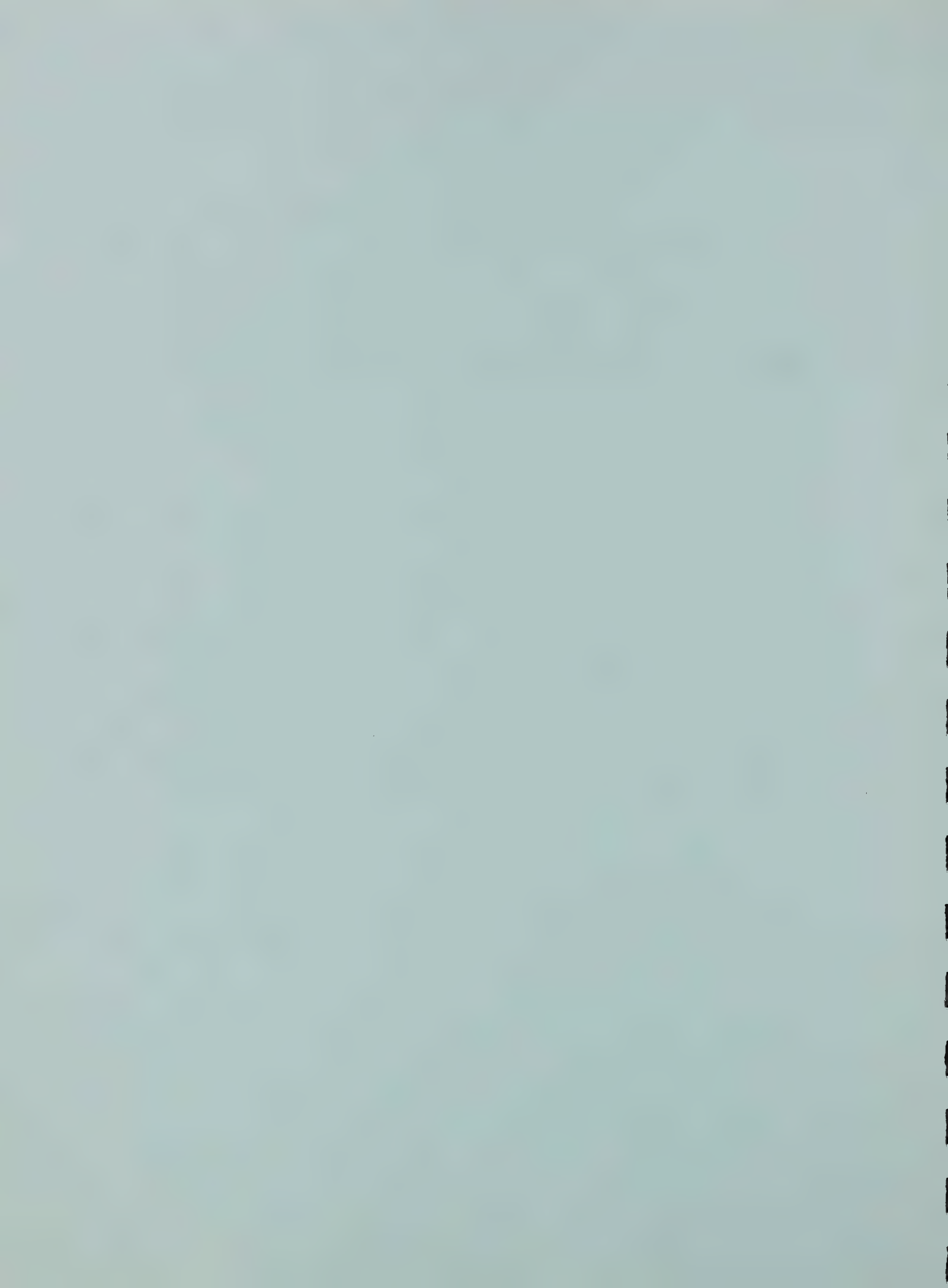
SAFETY ATTITUDE EXPECTED AND IMPORTANCE OF THE PROJECT

1. Who is responsible for Safety on this project?
2. If you see a safety hazard or an unsafe condition, how would you handle it and who would you report it to?
3. Who is responsible for correcting an identified hazard?
4. Who is responsible for the maintenance and operation of your vehicle?
5. How often should you check your vehicle for safety items?
6. Even though this project is of high priority and very important to the future of our timber production in the northwest how much is it really worth?
 - a. Your life?
 - b. A serious injury?
 - c. A vehicle accident?
 - d. A minor accident?
7. There are and always will be hazards involved in this project. We will never be able to eliminate them all. We will never know or identify all of the hazards. Describe in your own words what a hazard is.
8. What is risk? And who is responsible for managing risk?
9. Describe in your words what your personal goals or objectives are for this project (money, experience, to see new country, etc.).
10. Which statement do you think will best describe the spray project?
 - a. Basic attitude is that personal injuries are inevitable.
 - b. Basic attitude is that personal injuries can be prevented.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER X

SPILL MANAGEMENT



CHAPTER X

SPILL MANAGEMENT

I. STANDARDS

The objective of spill management is to eliminate the possibility of spills by planning and monitoring (through daily inspections) any operation where insecticides, diesel, jet fuel, or other petroleum based products are being used. In the event of a spill of any of these products, project personnel will take immediate action to correct the problem. These efforts will be continuous and progressive depending on the product and nature of the spill. Any leaks and/or spills will be the responsibility of the Contractor to clean up and dispose of according to State laws and regulations. The Forest Service and State personnel will assist the Contractor in any containment notification or monitoring effort without assuming the Contractor's liabilities.

Prior to starting work, the Contractor will submit to the COR a copy of contingency plan of action in the event of insecticide spills and/or accidents. Plans including use of the Region Response System are required.

To assist the Contractors with a spill plan, we have suggested outline in Appendix 2.

All incidents will be reported in accordance with the Operation Plan and project guidelines.

A. Procedure

The nature of the incident will determine how it is handled (refer to Exhibit 2).

1. Small Incidental Leak or Spill

Small leaks or spills will be handled by on-scene personnel. Such spills or leaks will be corrected by contract administration and recorded in the Contract Administrator's log. Such incidents may not hinder the operation progress. This type of incident might include the following: A leaking valve; an equipment malfunction; over filling a tank; or any problem that can be corrected by simple maintenance.

2. Minor Incident

A minor incident does not cause any significant interruption of the project operation. Minor incidents are those that do not threaten life, health or property directly and immediately. Minor incidents are not perceived by the public to be a problem. Minor incidents such as leakage of petroleum products at a heliport or soil contamination from a leaking tank truck will be corrected through prompt action by project personnel. Minor incidents will be

recorded in the Contract Administrator's log and may require some outside notification.

3. Major Incident

If a major incident occurs, disruption to the project operation is imminent. Major incidents are emergencies or incidents that cause an immediate threat to life, property or resources, or an event perceived by the public to be a significant problem. An overturned tank truck that dumps insecticide into a stream supplying nearby domestic water would be a major incident. Major incidents will require notification of various jurisdictions and requests for assistance as needed.

B. Responsibility

1. The Contractors are responsible to prepare spill plans for their operation. Spill plans will be reviewed by the Project Director, Contract Administrator and Safety Chief. Spill plans will be submitted to the Department of Environmental Quality along with the project's plan.
2. Designated project personnel will provide guidance and assistance to the Contractor to meet project objectives.
3. The Contract Administrator will ensure that Contractors involved in incidents complete control and cleanup actions to the extent necessary to protect the environment and meet standards set by the Forest Practices Rules and applicable state laws and rules. Documentation and follow-up will be done by the Safety Section.

C. Spill Control Techniques

1. Containment - Dirt berms may be used to stop the spread of a spill or divert it to less sensitive areas. Petroleum products float on water providing a chance to contain the spill by means of floating barriers, straw or specifically designed absorbent materials.
2. Filtration - Spills can be soaked up with dirt, sawdust, newspaper or almost anything that will absorb the contaminant. Special absorbent pads or pillows may be necessary. Sweeping compound works well to soak up spills on paved or hard surfaces.
3. Neutralization - DEQ or other specialists may suggest methods of control to neutralize a contaminant and prevent damage.

D. Other Agency Involvement

Refer to the Project Plan.

E. Investigation and Review

An integral part of the control effort is investigation of the incident and analysis of its causes so future preventive measures can be taken. Investigations may include personnel from an outside agency if an incident involves multi-jurisdictions. Incident Report, Exhibit 3, is for use when documenting an incident. In addition, some incidents may require the use of DEQ Emergency Spill Response Report, Exhibit 4.

EXHIBIT 1

SPILL MANAGEMENT GUIDELINES

The following guidelines apply to all aspects of the projects field operations (bulk storage, application and transportation):

1. Report all pesticide spill over one gallon (mixed product). Use the Incident Report Form (Exhibit 3) provided by the Safety section to document the incident.
2. A small incidental leak or spill, in general, refers to a spill of insecticide and/or diesel, jet fuel or other petroleum related product of one gallon or less. Complete documentation and reports by the end of the daily shift and submit to Unit Manager and the Safety Section.
3. Minor incidents, in general, refer to spills of more than one gallon but less than 25 gallons. A minor spill may best be defined as an incident that is not perceived by the public to be a problem. A minor spill would not be threatening to life, health or property.
4. A major incident, in general, refers to a spill of 25 gallons or more however any spill that is perceived by the public as a problem may fit this description. Major incidents require notification to appropriate people at the time of the spill. All reports and forms must be filled out and submitted by the end of the daily shift.

EXHIBIT 2

GENERAL INCIDENT RESPONSE GUIDE

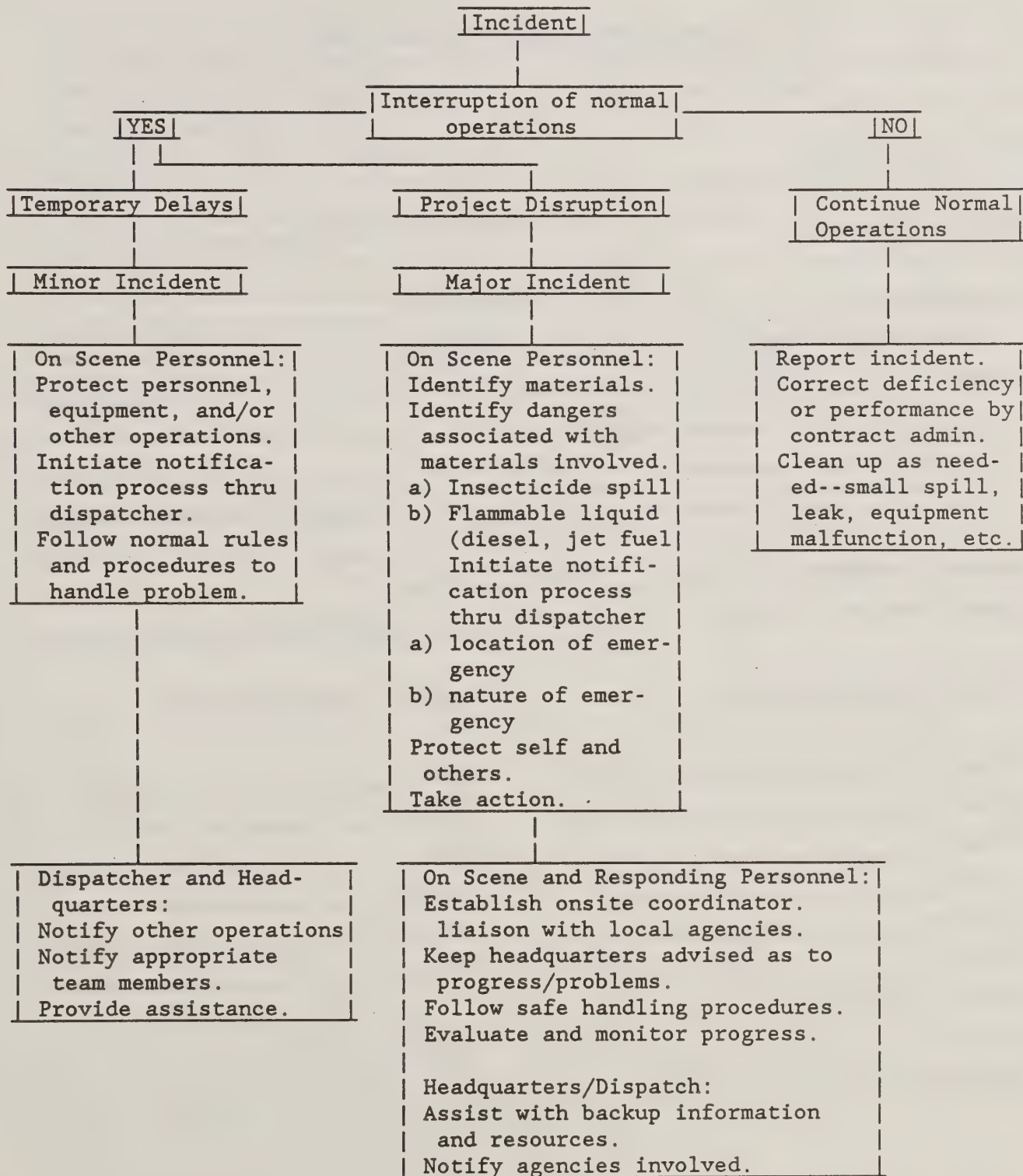


EXHIBIT 3

SPILL OR ACCIDENT REPORT

Spruce Budworm Spray Project 1987

DATE ____/____/____

Investigator _____

1. Type of Incident:

Personal Injury: _____

Ground Spill _____

Aircraft _____

Off-target Spraying _____

Vehicle _____

Other: _____

2. Date of Incident: ____ ____ ____ Time: ____ AM ____ PM

Agency Involved: State _____ Federal _____ Contractor _____

3. Aircraft Identification:

Vehicle Identification:

Type _____

Type _____

Owner _____

Owner _____

Team _____

Team _____

Pilot _____

Driver _____

Address _____

Address _____

Phone _____

Phone _____

Aerial Oabserver _____

Address _____

Phone _____

Heliport/helispot Involved _____

EXHIBIT 3 (Continued)

4. Incident Location:

County _____

Spray Block _____

Area _____

Legal Description _____

Area Description:

5. Insecticide:

Product Name _____

Amount Involved (gallons) _____

How was Insecticide Handled _____

6. Description of Incident and Probable Cause:

EXHIBIT 3 (Continued)

7. Personal Injury:

<u>Name of Injured</u>	<u>Received Medical Treatment</u>	<u>Hospitalized</u>	<u>No Treatment</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Hospital: Name _____
Address _____
Phone _____

Physician: Name _____
Address _____
Phone _____

8. Other Damage:

Environmental _____ Building _____ Vehicle _____
Other _____
Description of Damage: _____

EXHIBIT 3 (Continued)

9. Comments:

10. Date of Follow-up Investigation _____
Investigator _____

EMERGENCY REPORT

Report No. _____

1. Type of emergency _____
2. Time _____ Date _____ Info taken by _____
3. Name, Address, Phone of person reporting emergency _____

4. Location where person reporting emergency can be reached if different from location above. _____

5. Emergency location T____, R____, Sec____ Sub Sec____ County____
Location by Land Marks _____
6. Is anyone at the emergency site? _____ How many? _____
7. Are there injuries involved? _____ How many? _____
8. Is rescue equipment needed? _____
Ambulance____ Helicopter____ Towtruck____ Other____
9. Should anyone be contacted? _____ Relationship _____
10. Name, Address, Phone _____

11. Special needs or additional information _____

Emergency reported to _____

Date _____ Time _____

Remarks _____

SPILL MANAGEMENT

STORAGE SITES

TO BE COMPLETED LATER.

SPILL COORDINATION TELEPHONE DIRECTORY

1987 Spruce Budworm Spray Project

EMERGENCY NOTIFICATION PROCEDURES

When a spill occurs, the following contacts are to be made in the order listed:

<u>WHO</u> ----->	<u>CONTACTS</u> ----->	<u>WHO</u>
Project Personnel	If No Answer or Alternate	District Spill Coordinator Forest Spill Coordinator or Alternate Regional Spill Coordinator or Alternate OARS-EMD (Oregon Spills) DES (Washington Spills)
District Spill Coordinator----->		Forest Spill Coordinator or Alternate Regional Spill Coordinator or Alternate OARS-EMD (Oregon Spills) DES (Washington Spills)
Forest Spill Coordinator ----->	If No Answer or	Regional Spill Coordinator or Alternate OARS-EMD (Oregon Spills) DES (Washington Spills)

MALHEUR NATIONAL FOREST

<u>Position</u>	<u>Name</u>	<u>Office</u>	<u>Home</u>
Forest Spill Coordinator	Jim Payne	(503) 575-1731	
Alternate	Vern Gray	575-1731	
Alternate	Mike Cavin	575-1731	
District Spill Coordinators			
Bear Valley RD Alternate	Dorman Gregory	(503) 575-2110 575-2110	
Burns RD Alternate	Charlie Cagle	(503) 573-7292 573-7292	
Long Creek RD Alternate	Tim Holly	(503) 575-2110 575-2110	
Prairie City RD Alternate	Dick Standley	(503) 820-3311 820-3311	
Forest Hydrologist		(503) 575-1731	
Forest Silviculturist		575-1731	
Forest Engineering		575-1731	
Forest Dispatcher	Barney Hopf	575-1731	
Forest PIO		575-1731	
Regional Spill Coord.	Buck Pino	(503) 221-2931	(503) 640-8687

State Agencies

Office

Home

Oregon

OARS - EMD (Oregon Accident Response System - 1-800-452-0311
-- Emergency Management Division)

Oregon State Dept. Of Environmental Quality
Portland, Or. (503) 220-5696

Dept. of Fish & Wildlife
John Day - Greg Halton/Errol Claire (503) 575-1157

Dept. of Forestry
John Day - John Boro (503) 575-1139

Health Division - John Day (503) 575-0429
- Burns (503) 573-2271

MALHEUR NATIONAL FOREST (Continued)

State Police - John Day (503) 575-0471 or 1-800-452-6516
- Burns (503) 573-2188 or 1-800-452-2131

County Agencies

Office

Home

Grant County

Sheriff - Rod Walker (503) 575-1131
Roadmaster 575-0138
Emergency Management 575-0059

Harney County

Sheriff (503) 573-6156 after hrs. 573-6028
Road Superintendent 573-6456
Emergency Management 573-6356

WENATCHEE NATIONAL FOREST

<u>Postion</u>	<u>Name</u>	<u>Office</u>	<u>Home</u>
Forest Spill Coord.	Grover Payne	(509) 662-4335	
Alternate	Doug Bowie	662-4335	
Alternate	Forest AO	662-4335	
District Spill Coordinator			
Naches Ranger District	Jim Tyler	(509) 653-2205	
Alternate	Don Rotell	653-2205	
	Keith Hole	653-2205	
Forest Hydrolgist		(509) 662-4335	
Forest Silviculturist		662-4335	
Forest Engineer		662-4335	
Forest Dispatcher	Doug Bowie	662-4335	
Forest PIO		662-4335	
<u>State Agencies</u>			
<u>Washington</u>			
DES (Dept. of Emergency Services)		(206) 753-5990	
Dept. of Ecology		(206) 575-2490	(24 Hr Spill Response)
Dept. of Game		(206) 575-2740	- District Officer
Dept. of Natural Resources - Ellensburg		(509) 925-6131	
Wash. State Patrol		(509) 575-2320	
<u>County Agencies</u>			
<u>Yakima County</u>			
Sheriff's Dept.		(509) 248-3530	
Hazmet Team		(509) 248-3530	

SPILL LOG

1. Who reported the spill?

Name _____
Address _____
Phone No. _____

2. Location of Spill _____

3. Source of Spill _____

4. Material Spilled _____

5. Date & Time of Spill _____

6. Spill Quantity _____

7. Area or Waterbody Endangered _____

8. Personnel at Scene _____

9. Actions Initiated _____

10. Shipper/Manufacturer _____

11. Container Type _____

12. Truck I.D. No. _____

13. Placard/Lable Info. _____

<u>Relayed to:</u>	<u>(Date)</u>	<u>(Time)</u>
_____ (District Spill Coordinator)	_____	at _____
_____ (Forest Spill Coordinator)	_____	at _____
_____ (Regional Spill Coordinator)	_____	at _____
_____ (OARS-EMD or DES Rep.)	_____	at _____

LOG OF EVENTS

<u>Date</u>	<u>Time</u>	<u>Action Taken/Event Occurring</u>
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1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER XI

ENVIRONMENTAL PROTECTION AND MONITORING

CHAPTER XI

ENVIRONMENTAL PROTECTION AND MONITORING

I. WATER RESOURCES

A. Water

State law does not permit application of B.t. to water. However, B.t. may be applied to the water's edge. Therefore, along waterbodies and Forest Service Class I and II streams, aircraft applying spray will be required to fly a set distance from water to avoid direct application. Flight routes parallel to streams are recommended. For waterbodies peripheral flight routes with no overflights of the waterbodies are recommended. For domestic or municipal water sources, avoidance or buffering those exposed above ground may be required by the people/agencies who receive their water from these sources. Below ground water sources should not require avoidance. When possible above ground sources will be covered to avoid reasonable spraying with B.t.

B. Water Resources Monitoring

1. Quality Control Monitoring

a. Water

The effectiveness of mitigating measures regarding the avoidance of open water will be assessed using spray cards and/or aquatic insect drift net sampling representative of streams and lakes.

Aquatic invertebrate drift sampling will be conducted for 48 to 72 hours prior to and after treatment.

Samples will be collected by six hour periods (approximate) and the identity of each six hour sample retained.

Preferred sampling periods are 5:00 a.m. to 11:00 a.m., 11:00 a.m. to 5:00 p.m., 5:00 p.m. to 11:00 p.m., and 11:00 p.m. to 5:00 a.m.

The aquatic drift sampler will have a sufficient mesh size to allow fine sediments to pass through (nets with a 0.5 mm mesh are preferred).

Aquatic drift samples will be collected, preserved and analyzed for composition down to order and in some cases genus.

Pesticide residues in domestic water supplies, waterbodies or streams collected as grab samples will be measured using

procedures identified by Bill Garrigues, Hydrologist and Environmental Monitor for the Wenatchee Budworm Project. This will entail laboratory analysis by qualified personnel.

Quality control monitoring would be conducted and/or supervised by Gene Silovsky with the assistance of one full time assistant at the GS-5 or 7 level. Malheur's Forest Biologists and the Forest's Hydrologist would periodically be asked to participate in the process. Equipment would be limited to field items such as hip boots, five aquatic insect drift nets, collection bottles and preservatives. Two trucks would be needed for field work. Total equipment costs excluding vehicles would be around \$600.

A portion of the stream aquatic insect monitoring would be conducted under contract. Insects collected would also be analyzed under a contract. Water analysis for B.t. residue will require off site laboratory analysis by qualified personnel.

2. Spill Monitoring

In the event of an insecticide spill into a stream or water body water samples, drift net samples and visual observations would be used to track insecticide distribution and effects. Please refer to the Project Spill Plan.

3. Environmental Effects Monitoring

The results from the aquatic insect drift sampling will be used to provide an index to environmental effects.

II. TERRESTRIAL RESOURCES

A. Terrestrial Resources

A variety of terrestrial areas/resources will require special treatment.

1. Research Plots

Several long-term research plots occur within the spray area. Preliminary contacts indicates these must be avoided and buffered.

2. Endangered/Threatened/Sensitive Species Habitats

Known and inhabited nest sites of bald eagles, peregrines, golden eagles, colonial nesters (herons)...should be avoided and buffered. Bald eagle nesting sites will be avoided by one-half mile.

3. Other Areas

Identified by the Malheur National Forest Supervisor.

B. Terrestrial Resource Monitoring

1. Quality Control Monitoring

a. Terrestrial Sites

Spray cards will be used to monitor avoidance of selected areas along with visual observations. Project personnel will conduct the monitoring.

2. Environmental Effects Monitoring

The 1987 Environmental Assessment identified that the following monitoring will be considered in the plan and implemented if necessary:

In areas planned for B.t. application, to measure the effects of insect food supply reductions on insectivorous birds.

In 1986, a study was done to determine the secondary effects of B.t. spray on chickadees during the 1986 Gypsy Moth Project in western Oregon (Gaddis and Corkran, 1986). Spray areas were treated three to four times with 16 to 20 BIU's per acre. Results indicated that there was a significant difference in the number of lepidoteran caterpillars available for food between treated and untreated areas; however, this did not affect chickadee reproductive success or fledging development; chickadees simply found other food between treated and check areas.

This is one recent study in Oregon that indicates secondary effects to insectivorous birds are minimal. Other studies cited in the Budworm EA indicate similar results.

Because of the following reasons, monitoring the effects of reductions in insect food supplies on insectivorous birds is not planned.

- a. Most previous studies indicate little adverse effect.
- b. Insectivorous birds are generally opportunistic and will find what other food is in greatest supply.
- c. Not all budworms will die because of treatment.
- d. Not all areas within the large treatment areas will be treated, i.e., non forest types and non-host types receive no treatment.
- e. B.t. is specific to lepidopterous insects, therefore, populations of other insects will not be reduced.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER XII

TRAINING

WESTERN SPRUCE BUDWORM TRAINING

April 13-17, 1987
Shilo Inn - Eugene, Oregon

Monday, April 13

PM--12:30 Register and pick up packets (Contracts, Operational Plan, Organizational Charts, etc.)

		<u>Speaker</u>	<u>Title</u>
1:20	Welcome USFS, BLM, State; Go over course schedule and introductions of all parti- cipants	Ron Libby	Ops. Manager
2:10	Welcome and Comments and Forest and Public's view on project in the John Day area	Bob Williams Ken Evans	Acting Deputy Regional Forester Forest Supervisor, Malheur NF
2:30	Welcome and Project Goals	Iral Ragenovich	Supvy Ento- mologist, R-6
2:40	Outlook for Malheur Area	Bill Butler	Unit Director, Malheur
3:00	Break		
3:20	Outlook for Wenatchee Area	Ben Siminoe	Unit Director, Wenatchee
3:40	Background and Outlook of Western Spruce Budworm and B.t. and How it Works	Bruce Hostetler	R-6 Entomolgist
4:40	Safety attitude expected and importance on the project	Wayne Long Earl Brown	Safety Chier-Mal Safety Chief-Wen
5:00	Off		
7:00	Meeting-in the 3 section groups	1. Wenatchee 2. N. Malheur 3. S. Malheur	
7:30+	Off	Groups will come up with two questions or topics that they feel need to be answered through the course of the training session (possibly need a change in the agenda).	

Tuesday, April 14

		<u>Speaker</u>	<u>Title</u>
AM-- 8:00	Questions, Comments from Groups		
8:10	Administration and Logistics	Myrna Evans	A.O., Malheur
8:30	EA	Iral Ragenovich	Supervisory Entomologist, R6
9:50	Break		
10:15	Helicopter Safety, Personal Protective Gear, Incident and Accident	John Cramer	Safety Instruct. Off. of Aircraft Services (OAS) Boise, Idaho
PM--12:00	Lunch		
1:00	Helicopter Safety, Personal Protective Gear, Incident and Accident	John Cramer	
2:50	Break		
3:15	Heliport Management/Administration	Dick Dale	Helicopter Operation Specialist Regional Air Group-R6
3:45	Helicopter Take-off Landings	Dick Dale	Helicopter Operation Specialist Regional Air Group-R6
5:00	Off		
7:00	Meeting- all spray groups, Administration, Overhead, etc. get in their specific unit groups and discuss job descriptions and how that unit will operate.		
7:30+	Off		

Wednesday, April 15

		<u>Speaker</u>	<u>Title</u>
AM-- 8:00	Questions		
8:10	Disaster Preparedness Planning	Dick Dale	Helicopter Operation Specialist R-6 (RAC)
9:10	Fixed Wing Safety/Aerodynamics as differ from Helicopter	Ted Herd	Fixed Winged Off., R-6 Group
9:50	Break		
10:15	Helicopter Aerodynamics, Models and Limitations (Power Check, Load Calculations, etc.)	Greg Conway	Helicopter Program Off. (R6 Check Pilot)
PM--12:00	Lunch		
1:00	Wenatchee Oper. (Spray Crews)	Gordon Orlogg	Ops. Manager
	John Day Oper. (Spray Crews)		
	South	Paul Joseph	Ops. Manager
	North	Ron Libby	Ops. Manager
1:45	Operation Plan (Introduction)	Jim Warner	Plans/Tech Adv.
2:10	Film on Spraying	Ron Libby	Ops. Manager
2:35	Wake-up Call-(Stand up Break)		
2:40	Typical Spray Day (as to operations)	Joseph, Libby, and Orloff	Ops. Managers
3:20	Break		
3:45	Plans and Intelligence	Jim Warner	Plans/Tech Adv.
4:05	Liaison-How will we notify the Land Owners and Other Agencies	Paul Joseph and Gene Silvosky	Ops. Manager (St) SF&G/Env. Mon.
4:20	Public Affairs-How will it function and who talks with the Press and Other Agencies	Chuck Davey and Dee Westerburger	Asst. PIO Wenatchee PIO Malheur
4:35	Safety-How Safety Officers will function and the safety outlook for the project	Wayne Long & Earl Brown	Safety Officers Wenatchee & Malheur
5:00	Off		
7:00	Meeting - all specialized jobs get together to discuss their positions on the projects (Wenatchee and Malheur projects). (A.T.L., L.C., Administration, A.O's, G.Ob's, Safety Officers, etc.)		

Thursday, April 16

		<u>Speaker</u>	<u>Title</u>
AM-- 8:00	Questions		
8:10	Spill Management	Wayne Long & Earl Brown	Safety Off-Mal Safety Off-Wen
8:40	Environmental Protection and Monitoring-What are we doing and why	Silovsky & Garrigres	SF&G/Env. Mon/ Mon. Leader
9:00	Training-Importance of and what kind is needed	Ron Libby	Ops. Manager
9:10	Demobilization-What needs to be done and why.	Jim Coyle	
9:30	Records-Information needed timeliness and the reasons why	Lynn Sullivan	Plans Coordinator
9:55	Break		
10:15	Vehicle Use	Allen Cosan & Earl Brown	Fleet Mngr-Mal Fleet Mngr-Wen
10:30	Radios - 9600, King BIFC, et Film on 9600 radio (5 minutes)	Roberts &	Radio techs.
11:45	Pathlink Recorder How they are used and the results expected from them	Jim Warner	Plan/Tech Adv.
PM 12:00	Lunch-munch, munch, munch		
1:00	Contracts-in depth review of the application and making contracts	Ron Cason & Jim Warner	Contract Specialist USFS, R6 Plan/Tech Adv.
3:00	Break		
3:25	Contracts (same as above)	Ron Carson and Jim Warner	
5:00+	Off		
7:00	Possible night session if needed.		

Friday, April 17

		<u>Speaker</u>	<u>Title</u>
AM-- 8:00	Wake-up		
8:01	Questions		
8:10	Administration (do's and don't on project, housing, ??????????????????, (1st 40) etc., 1st few weeks, phone use	Myrna Evans	A.O. on (Malheur
9:00	Test		
9:30	Summary of Training and Project Arrival dates for Project Personnel	Steve Howes Don Hanson John Keerseemaker	Unit Dir., North Unit Dir., South Asst. Unit Director, Wen

Travel Home

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER XIII

DEMOBILIZATION

CHAPTER XIII

DEMOBILIZATION

The purpose of this chapter is to provide all project managers with a common format to assist with the demobilization process. The demobilization process is the planned and orderly return of personnel, equipment records and supplies on the project with a minimum impact upon the agencies or owners involved. A properly conducted demobilization plan should begin from the time the personnel and equipment are ordered. Everything that arrives on the project must also be used or returned. Maintaining accountability of all personnel, equipment, vehicles, records and other data associated with the Spruce Budworm Project is essential.

During the project, attention to the following items will ease the workload and speed up the final phase of demobilization.

A. Maintain all personnel records

1. Submit time accounting reports as per project finance section requests.
2. Report all personnel status changes promptly.

B. Maintain equipment records

1. Maintain a record of all rented or leased equipment containing rentor/lessor, date of rental and approximate date of return.
2. Maintain a record of all borrowed equipment and owner.
3. Maintain a record of all equipment obtained from the project supply office.

C. Maintain vehicles and records

1. A complete list of vehicles and their drivers will be maintained.
2. Have necessary repairs completed promptly.
3. Report all vehicle damage or accidents.

D. Records maintenance

1. All project records and files will be sorted and labeled. These records will be eventually submitted to the Plans Unit for processing and storage. Those items to be included, but not limited to, are:
 - a. Project Inspector's Diaries
 - b. Project maps
 - c. Daily Accomplishment Summaries
 - d. Flight logs
 - e. Daily Spray Plans
 - f. Project Critiques
 - g. Contract Administration Guidelines and Checklists
 - h. Other

As the project progresses into the final application stage, the demobilization process will increase in intensity and will require more attention by the unit managers. Near the end of the project, each manager will prepare a specific

final demobilization plan for their area of responsibility. The plan should consider the following items:

1. Performance Appraisals

All individuals assigned or employed on the project will be given a performance appraisal. Each person will be rated by their immediate supervisor with a review by the appraiser's supervisor.

2. Equipment clean-up and return

Each unit manager will inventory and account for equipment assigned to their unit. Those items checked out from supply will be returned. Make arrangements to return items acquired from other sources.

3. Completion of administrative and fiscal reports

Prior to release, individual supervisors will ensure time sheets are signed and turned in to Administration. Time sheets will include an estimate of time in travel status to the home district for accounting purposes. In addition, estimated mileage for vehicles will be made for the return trip to their home unit. Expense accounts will be finalized and submitted for approval.

4. Clean up of lands, facilities and equipment

Plans will include provisions to clean and rehabilitate helispots, service areas, offices, equipment and vehicles to as normal condition as possible.

5. Conduct official project reviews

Each unit manager will hold and record any project review as required in Chapter XIV.

6. Put files, records and reports in order for transfer to the appropriate office.

7. Assemble a complete set of photos, slides and video tapes to document project activities.

8. Write letters of appreciation to cooperators.

OPERATIONS DEMOBILIZATION PLAN

The purpose of this plan is to provide for an orderly demobilization of the Operations Sections. This plan will outline the porcedures required to recover signed-out equipment, closeout of lodging, time and operations critique.

REQUIRED OPERATIONS PROCEDURES

A. Section Level Critique:

A section level critique will be held with the Aerial Operations Managers, Teams and Unit Director. This critique will be a compilation of the team's critique and operations managers. This input will form the official operations critique.

B. Check-out Procedure:

1. Each Team Leader will inventory and account for the equipment assigned to his/her team. (Examples are radios, canopies, belt weather kits, etc.)
2. Performance Ratings - Each individual assigned to a team will have a performance rating. The team leaders will do their peoples ratings. The Aerial Operations Managers will rate the Team Leaders. The Operations Managers will act as the second level reviewer of the team members. The Operations Manager will be the second level reviewer of the Team Leaders. In all cases, the Unit Director will initial the performance ratings.
3. Clean-up - Aerial Operations Managers will be responsible in making team assignments for cleanup of helispots. When assignments are made, the Team Leader will have responsibility for helispots they are assigned. Individuals with assigned vehicles will be responsible for clean-up of the vehicle and the return of equipment.
4. Time Reports and Expense Accounts - Prior to release, individual supervisors will ensure time sheets are signed and turned into Administration. Time sheets will provide an estimate of time in travel status. This estimate is for cost accounting purposes. In addition, estimated mileage for vehicles will be made for the return trip to their home unit. Expense accounts will be finalized and submitted for approval.
5. Other Items - When the helispots have been rehabilitated, Operations will inform Plans that the landowners can secure their property. Operations will also return all keys to Plans. All photos will be returned to their individual photo sets.
6. Records and Reports - All project level records and reports being kept by Operations will be labeled, filed and submitted to Plans.

SAFETY DEMOBILIZATION PLAN

The following checklist will be used to guide demobilization of the Safety Section:

1. Complete time reports.
2. Complete vehicle records.
3. Complete expense allowance (per diem) sheets.
4. Collect accountable equipment and other supplies checked to individuals on the project.
5. Turn in all accountable equipment.
6. Critique Safety Section function.
7. Complete performance appraisals.
8. Clean up Safety Office and remove personal belongings.
9. Write letters of appreciation to individuals assisting in the safety function.
10. Close out personal injury files.
11. Close out vehicle accident reports.
12. Complete alleged damage claim files.
13. Put personal records in order.
14. Summarize safety record of the project.

CLEANING SPRAY EQUIPMENT

Specific heliports will be designated as washdown sites for helicopters and rinsing of their spray systems.

Tank rinse water from batch trucks and water used to wash spray systems of helicopters can be disposed of at these designated washdown sites. If insecticide material is visible on the ground, dilute the mixture with water and allow the material to soak into the ground. Do not rinse batch trucks at the base camp. Accumulate the rinse water into one truck and take the rinse water to a designated washdown site for disposal. Spread the material out on the ground.

Dry material, such as kitty litter or absorbent pads, should be placed in a plastic garbage bag and placed with the other items for disposal at the bulk storage area. This material will be taken to a designated landfill at the completion of the project.

Abbott Laboratories recommends the following cleaning procedures of mixing, pumping and spray equipment: (1) remove in-line screens and nozzles, (2) flush the entire pumping and spray systems with water containing detergent (i.e., Top Job Liquid Cleaner at 1 quart/100 gallons), (3) final rinse with water and replace in-line screens and nozzles.

PUBLIC AFFAIRS DEMOBILIZATION

- A. Collect and organize picture coverage of project.
 - 1. Review 35mm slides and b/w to assure the project has been adequately recorded on film.
 - 2. Check with others on the project and with contractors who have taken pictures.
 - 3. Work with and assist contractors with their needs for photo coverage.
 - 4. Assemble slide and b/w photo presentations for participating agencies. (5 sets)
- B. Write history of Public Affairs position of project.
 - 1. Grant County situation. Data: No. of calls, charts of phone calls, media phone contacts, major media, No. of damage complaints/claims.
 - 2. Listing of forms developed.
 - 3. Filing system for documents and records.
- C. Organize "Final Media Event"; coordinate with Project Director and Assistant Project Director.
- D. Turn in equipment.
 - 1. Coordinate with Supply Chief.
- E. Write performance appraisals and evaluations.
 - 1. Complete appraisals on PIOs.
 - 2. Send copy of appraisal to each PIO and mail copy to his/her agency supervisor.
 - 3. Give critique to each PIO (PA functions).
 - 4. Send "thank you" letters to PIOs.
- F. Complete payroll
 - 1. Collect time sheets and vehicle logs from each individual before he/she leaves project.

2. Have temporary employees check out with Fiscal Officer before leaving on final day.
- G. Revise Operations Plan to reflect actual operations.
- H. Develop staffing schedule for final phase of project.

PLANS AND INTELLIGENCE DEMOBILIZATION

A. Post Spray

1. Debrief all unit personnel and ensure that the performance of all unit personnel is reviewed and recorded.
2. Compile permanent project records and maps for transfer to the Forest. Included will be:
 - a. Daily Spray Reports
 - b. Data Gase Reports
 - c. Weather Reports
 - d. Maps and Aerial Photos
 - e. Intelligence Files
 - Land ownership information and letters of consent
 - Field weather reports
 - Expenditures
 - Aircraft Incidents
 - Fuel/Air ratios
 - National Weather Service agreement
 - Heliport records
 - County road restrictions
 - Photo and map providers
 - Operations Plan
 - f. Examples of forms developed for the project
3. Ensure that all borrowed and rented equipment is returned and that all agreements for services are in proper order. Included will be:
 - a. Inventory computer hardware and office machinery and return to vendor(s).
 - b. Insure all persons hired for weather observation and other temporary duties have been compensated.
 - c. Other items as developed in the project and Unit Demobilization Plan.
4. Write letters of appreciation to people, organizations and businesses who helped and cooperated with the project.

PROJECT DEMOBILIZATION FINAL WEEK

The purpose of this plan is to provide an orderly transition of the spray application project to a monitoring function. Some project functions will continue to operate some time after spraying is completed. This plan will outline the steps to bring the project to this reduced level.

A Prior to the end of the project:

1. Provide porta files and packing boxes to each unit.
2. Check-in unused equipment.
3. Arrange for trucks to return equipment to sending agency.
4. Provide a listing of all equipment to each unit of equipment to be returned to supply.
5. Arrange for disposal of expendable and single purpose supplies. (Electrical, office steps, etc.)
6. Complete performance appraisals.
7. Review and revise Operations Plan.

B. First day after last spray day:

1. Second day check-in equipment and vehicles from other units and make provision to return pool vehicles to appropriate agencies.
2. Check-in and sort returned equipment.
3. Clean out all offices except Administration, Plans and Insect Laboratory.
4. Process final payroll.
5. Start loading trucks.
6. Pick up project signs from highways and trailers.
7. Remove portable toilets (or stop service until demob. is complete).
8. Check-in radios and remove radio repeaters.
9. Remove candy and pop machines.

C. Third Day

1. Assemble list of missing property.
2. Start return of property.
3. Finish Administration work and release Administration crew.

D. Fourth Day

1. Finish returning property.
2. Start headquarters cleanup.
3. Remove phone system not being used.
4. Remove computer terminals not being used.
5. Return remaining vehicles.

E. Some functional units of the project will continue after the completion of the spray program. Those units will develop specific demobilization plans relative to their needs.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER XIV

PROJECT REVIEW GUIDELINES

CHAPTER XIV

PROJECT REVIEW GUIDELINES

I. PROJECT REVIEW

A project review is a complete analysis of the entire project's actions and management to determine various weak and strong points of the project.

A. Objectives

1. To document successes that may be useful in future projects.
2. To identify problem areas and recommend solutions that may include changes in planning, organization, operations, management decisions, policy, etc.

B. Project Review Levels

The project will be reviewed at the following levels.

1. Branches of Project Review

- a. Each branch of the project organization will conduct a review of their portion of the project.
- b. If possible, all team members for each branch should be included in the review. If this is not possible, Branch Chiefs should assign someone the responsibility of obtaining input from those members not able to attend.
- c. The review should take place as soon as possible after the completion of the project--preferably before the team is demobilized.
- d. The Branch Chief will conduct a review--making certain all team members have an opportunity to provide input. They are also responsible to separate nit-picking from constructive input.
- e. The review should consider the following topics.
 - (1) Planning
 - (2) Organization
 - (3) Operations
 - (4) Demobilization
 - (5) Policy

2. Contractor/Project Management Review

- a. This level of review will include representatives of the Contractor and the Project Director, Assistant Project Director, Project COR's, and any Branch Chiefs who wish to attend.

- b. The review will take place at a time convenient to the Contractor and the project organization. This most likely would be before completion of the project and before the Contractor moves off the project. The Project Director or his designated representative will conduct the review.
- c. The review should consider the following topics.
 - (1) Contract provisions
 - (2) Contract administration
 - (3) Project planning, organization, and operations

3. Project Management Review

- a. The level of this review will include the Project Director, Assistant Project Director, and each of the Branch Chiefs.
- b. The review will be subsequent to the two previous levels and may be subsequent to demobilization.
- c. The Project Director or his designated representative will conduct the review.
- d. The review will consider topics covered in the previous two reviews, but from a broader perspective. The results of this review will be summarized in a written report and presented to appropriate agency heads.

4. Agency Review

- a. The level of this review will include the Project Director, Assistant Project Director, and agency heads or their representatives of agencies that had direct involvement in the project.
- b. The review will be held subsequent to the other reviews and will be subsequent to the completion of the project.
- c. The purpose of the review will be to present the summary of the previous project reviews and to review agency involvement in the project.

II. SUMMARY

The project reviews are intended to be constructive. They are not intended to fix blame or make anyone a scapegoat. They are intended to identify omissions, errors, problems, failures and successes. These should be reviewed constructively with the objective of gaining knowledge so that others may benefit.

The reviews should provide everyone with an opportunity for input. Those attending reviews have a duty and responsibility to participate in the reviews and to provide constructive, objective input that will result in improvements in future projects.

1987 WESTERN SPRUCE BUDWORM PROJECT

CHAPTER XV

ACCOMPLISHMENT RECORDS

CHAPTER XV

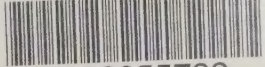
ACCOMPLISHMENT RECORDS

Official records of the gallons of B.t. sprayed are kept by the Contracting Officers Representative (COR). They are totaled on a daily basis on any "Aircraft Report" form by each Application Team Leader. These and the original load slips from the B.t. supplier will be the documents used for payments.

The Planning section will also keep records of gallons of B.t. sprayed and acres sprayed as an unofficial progress record. The Planning section received their data on a "Field Reporting" form filled out by each operations unit on a daily basis. The records from Plans will be used to inform State and Federal government agencies and will also be sent to the Public Affairs section to keep the public informed of the progress of the project.

Daily records are kept by the Planning section on a computer data base. An IBM personal computer is used for this purpose. A computer consultant is required to design a program specific to our needs. Records of acres and gallons sprayed and the date of each application are recorded by spray block and operations unit. The data base is capable of printing reports of acres and gallons sprayed by block, date, and operations unit.

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